OTAGO REGIONAL COUNCIL
RECEIVED DUNEDIN
26 FEB 2016
FILE No. RMIS 214
DIR TO Karen

chq for $1000 attached

GALLAWAY COOK ALLAN

25 February 2016

Otago Regional Council
Private Bag 1954
DUNEDIN 9054

Attention: Peter Christophers

OTAGO REGIONAL COUNCIL
RECEIVED DUNEDIN
11 APR 2016
FILE No. 9A56839
DIR TO Karen

Gallaway Cook Allan Lawyers Dunedin
Corner High & Princes Streets
PO Box 143
Dunedin 9054, New Zealand
Phone 03 477 7312
Fax 03 477 5564

Gallaway Cook Allan Lawyers Wanaka
24 Dunganvin Street
PO Box 450
Wanaka 9343, New Zealand
Phone 03 443 0044
Fax 03 443 6651

Dear Peter

RESOURCE CONSENT - CRIFFEL WATER LIMITED

We **attach** the outcome of consultation with the two Kaitiaki Runanga who have an interest in the application. You will observe that the Runanga do not oppose the application proceeding by non-notified resource consent on four conditions set out in KTKO Limited's letter. Conditions 1 and 3 are agreed.

Condition 2 is not agreed because the 35 year term sought is required to provide adequate security for the infrastructure upgrades envisaged by the application.

Condition 4 is also not agreed for the following reasons:

1. There is no convenient or reliable means to monitor residual flow below the weir. Although a flow measurement has been performed for the purposes of the application, a condition requiring a residual flow of 90 l/s at all times below the weir would require a major reconstruction in order to be readily monitored. Criffel Water Limited is currently confident that it is complying with its existing weir consent to pass 50 l/s because there is a comfortable margin for error based on the measurement taken.

2. The application proposes compliance with the minimum flow in the Regional Plan: Water at Luggate at 180 l/s. David Hamilton advises that it is this requirement that will "bite" first, since the relative sizes of the catchments will typically require at least 90 l/s to pass down the North Luggate Creek in order for the Regional Plan: Water minimum flow requirement to be met. There is accordingly no ecological utility in a separate condition requiring 90 l/s to flow below the weir.

Since Criffel Water Limited cannot accept all of KTKO Limited's proposed conditions, then the appropriate way forward is to commence formal processing of the application with limited notification to KTKO Limited and Te Ao Marama Inc. Please proceed accordingly.

Yours faithfully
GALLAWAY COOK ALLAN

Phil Page
Partner (Dunedin)
Email: phil.page@gallawaycookallan.co.nz

308132/1- L-2016210-PJP-Otago Regi-RESOURCE C.docx

KTKO LTD
consultancy

5 February 2015

Gallaway Cook Allan Lawyers Dunedin
P O Box 143
DUNEDIN 9054

Attn: Phil Page

Resource Consent – Criffel Water Limited

Proposal
Ngā Rūnanga understands that Criffel Water Limited are applying to:

- Take and use surface water for the purpose of irrigation, stock water supply and a hydro-electricity scheme – to combine existing Deemed Water Take Permits (7 Permit Holders) into one single water take resource consent and be managed by the company – The Criffel Scheme (as specified in the application provided)

Situation
Kāi Tahu ki Otago Ltd writes this report on behalf of Hokonui Rūnanga, Kāti Huirapa Rūnaka ki Puketeraki and Te Rūnanga o Ōtākou, two of the kaitiaki Rūnanga whose takiwa includes the site the application relates to.

Decision
It is considered that the proposal is not inconsistent with the Kāi Tahu ki Otago Natural Resource Management Plan 2005. (see appendices)

Rūnanga representatives have been informed and accept the proposal outlined in the application received 10 September 2015. Please be advised that Ngā Rūnanga does not oppose the application proceeding by non-notified resource consent procedure, on the understanding that there are plans to upgrade to more efficient methods of irrigation and subject to the following conditions:-

1. That the water take is monitored and results recorded.

2. That the term of consent be 25 years (to take effect from 2 October 2021)

3. That a fish screen is installed over the intake structure

4. That the residual flow is 90 l/s at the weir.

Ngā Rūnanga encourages the applicants to investigate more efficient methods of irrigation and also the holistic management of water takes and resulting land use to maintain and enhance the water quality of all waterways.
Ngā Rūnanga encourages the applicants to develop a farm environmental plan as a pathway for achieving compliance with the Regional Plan: Water for Otago.

Level 1, 258 Stuart Street, PO Box 446, Dunedin 9054, New Zealand
Phone 03 477 0071 • Cell 027 424 6372
Email info@ktkoltd.co.nz • www.ktkoltd.co.nz

This reply is specific to the above proposal. Any changes to the application will require further consultation.

Kāi Tahu ki Otago Ltd request that the Council forward a copy of the recommending report, and if issued, a copy of the consent.

Nahaku noa
Na

Chris Rosenbrock
Manager

cc Hokonui Rūnanga
Kāti Huirapa Rūnaka ki Puketeraki
Te Rūnanga o Ōtākou

G:\KTKO\1. RMA\Resource Consents\01.Resource Consents\2016\Reply Letters\20160205 - 3744-Luggate Crk-Galiaway Cook Allan(Criffel Water Ltd)water.docx

Appendices

The following Issues/Objectives/Policies of the Kāi Tahu ki Otago Natural Resource Management Plan 2005 are seen as relevant to the above proposal. This relates to the holistic management of natural resources from the perspective of local iwi.

Kāi Tahu ki Otago Natural Resource Management Plan 2005

Otago Region / Te Rohe o Otago

Wai Māori

Wai Māori General Issues

Water Extractions

- Inefficient irrigation methods and reluctance to consider alternatives.
- Volume of some extractions being more than is required.
- Cumulative effects of water extractions.
- Lack of water harvesting.
- Long duration of water take consents.

Wai Māori General Policies

- To protect and restore the mauri of all water.

Water Extractions

- To require that resource consent applicants seek only the amount of water actually required for the purpose specified in the application.
- To require that all water takes are metered and reported on, and information be made available upon request to Kāi Tahu ki Otago.
- To oppose the granting of water take consents for 35yrs. Consistent with a precautionary approach, either a review clause or a reduced term may be sought.

Irrigation

- To encourage those that extract water for irrigation to use the most efficient method of application. Flood irrigation, border dyke and contour techniques are less likely to be supported than spray irrigation techniques.
- To require that a consent term for water extractions for irrigation be of 5-10 years where Kā Papatipu Rūnaka considers the method of irrigation to be inefficient to allow for an upgrade to a more efficient method.
- To discourage over-watering
- To encourage irrigation to occur at times when winds are light and evaporation low.
- To encourage dry land farming practices where appropriate.

Otago Regional Council

COPY FOR YOUR INFORMATION

GALLAWAY COOK ALLAN LAWYERS
19 FEB 2016
BI
RECEIVED

Private Bag 1954
70 Stafford Street
Dunedin

Telephone 03 474 0827
Fax 03 479 0015
Freephone 0800 474 082

File No: _____

Officer in Charge: _____

To: The General Manager
Otago Regional Council
Private Bag 1954
Dunedin

WRITTEN APPROVAL OF A POTENTIALLY AFFECTED PARTY

Approval by Person(s) Potentially Affected by an Application for a Resource Consent

To be completed by the person requesting approval

Applicant:	Criffel Water Limited
Type of Resource Consent:	Water Permit - Divert, Take and Use Surface Water and to Disturb
Proposed Activity:	To take water at a rate of 601.8 l/s, for irrigation purposes, stock water supply and hydro generation.
Location:	Luggate Creek

To be completed by the person giving his or her approval:

Name: Dean Whaanga

Organisation: Te Ao Marama Inc

Street Address: 408 Tramway Road, Invercargill

We have sighted all the attached plans and supporting information for the above activity.

We hereby give approval for the proposal to be considered by the Otago Regional Council without public notification.

We understand that, if I give my approval, Otago Regional Council shall not take into account any effects that the proposed activity may have on me, when considering the application (Section 94(4) of the Resource Management Act 1991).

Please see attached letter

Signed: D Whaanga — D Whaanga, Resource Consents

Telephone: (03) 931 1242 **Date:** 17/02/2016

NOTE: IF YOU DO NOT UNDERSTAND WHAT THIS FORM IS, OR DETAILS ABOUT THE APPLICATION ASSOCIATED WITH THIS FORM, DO NOT SIGN IT.

TE AO MARAMA INC.

Tuesday 16th February 2016

Tēnā Koe,

Te Ao Marama Inc. does not oppose the application proceeding by non-notified resource consent procedure, on the understanding that there are plans to upgrade to more efficient methods of irrigation and subject to the following conditions:

1. That the water take is monitored and results recorded.
2. That the term of consent be 25 years (to take effect from 2 October 2021)
3. That a fish screen is installed over the intake structure
4. That the residual flow is 90 l/s at the weir.
5. That council should consider policy 6.4.2A and 6.2.5 of the Water Plan for Otago in assessing the application, that any new consent granted reflects the pattern of taking established under the existing consent. This policy is intended to improve water resource efficiency. This application should take into account the minimum flows which will apply to consents for the taking of water, as proposed in Policy 6.2.5.

Ngā mihi
Stevie-Rae Blair

bnz

George Street, Dunedin

GALLAWAY
COOK
ALLAN

PAY TO ORDER OF Otago Regional Council

DATE 25/02/2016

THE SUM OF One Thousand Dollars And 0 Cents

$ 1,000.00

NOT TRANSFERABLE

for Gallaway Cook Allan Trust Account

Bank of New Zealand

CHEQUE NUMBER 120052

⑈120052⑈ 020900⑆ 0025529⑈02⑈

1 Resource Consent Application

RECEIVED
11 APR 2016
BY: AB
3.40pm

Otago Regional Council

(For Office Use Only)
Deposit Paid: $

This application is made under Section 88 of the Resource Management Act 1991.

Charges/Deposits

A deposit **must** accompany the application (see page **7** for amounts). The applicant will be invoiced for all costs incurred in processing this application that exceed the deposit.

Please note that Council cannot accept electronic lodgement of applications at this time.

Please complete the application in pen. For questions marked with an * you will find notes on page 4

1. *Applicant(s) Details

Applicant(s) name(s) in full: _____

OR Company Name (in full) Cri fel Water Li mited

OR Names of Trustees (in full) if Applicant is a Trust _____

or Name of Incorporation _____

Postal Address _____ Post Code _____

Street Address (not a P O box number) _____ Post Code _____

Phone Number Business _____ Private _____

Mobile _____ Fax _____

Email Address _____

2. Consultant/Contact Details (if not applicant)

Name of Consultant/ Contact Person: Bridget Irving

Postal Address C/- Gallaway Cook Allan
276 Princes Street
Dunedin Post Code 9016

Phone Number Business 03 477 7316 Private _____

Mobile _____ Fax 03 477 5564

Email Address bridget.irving@gallawaycookallan.co.nz

3. a) *Are there any current or expired resource consents relating to this proposal?

Yes No

If yes, give Consent Number(s) and Description: 97629_V1, 94201, 95541, 95560, 96588, 2001.011.V1, Licence for Water Race 7284

b) Has there been a previous application for this activity that was returned as incomplete?

. Yes . No

If yes, give Consent Number(s) and Description: _____

c) Have you a pre-application lodged with Council for this activity?

. Yes . No

If yes, give pre-application Number(s) and Description: _____

d) Have you spoken to a Council staff member about this application prior to lodging this application?

. Yes . No If yes, please state name of staff member _____

4. **The applicant is (tick one):** ☐ owner ☐ leasee ☐ prospective purchaser **of the land on which the activity occurs.**

5. ***Who is the owner of the land on which the activity occurs/is to occur? (only complete if applicant is not the landowner)**

Name of landowner: _____

Postal Address _____

_____

_____ Post Code _____

Phone Number Business _____ Private _____

Mobile _____ Fax _____

Email Address _____

6. ***Who is the occupier of the land on which the activity occurs/is to occur? (only complete if the applicant is not the land occupier)**

Name of land occupier _____

Postal Address _____

_____

_____ Post Code _____

Phone Number Business _____ Private _____

Mobile _____ Fax _____

Email Address _____

7. ***Who leases the land on which the activity occurs/is to occur? (only complete if land is leased and it is not leased to the applicant)**

Name of land leasee _____

Postal Address _____

_____

_____ Post Code _____

Phone Number Business _____ Private _____

Mobile _____ Fax _____

Email Address _____

8. Tick the consents required in relation to this proposal:

Water

- Take Surface Water
- Divert
- Take Groundwater
- Dam

Discharge onto or into:

- Land
- Water
- Air

Land Use:

- Bore construction
- Bore alteration
- Activities in or on beds of lakes or rivers or floodbanks
- Disturbance of contaminated land

Coastal:

- Activities in the coastal marine area (i.e., below mean high water spring tide)?

Where you have indicated that a consent is required, you must complete the appropriate Application Form before your application can be processed. Application Forms can be found on the Council's website: www.orc.govt.nz.

9. What is the maximum term of consent you are seeking? _____years

10.Territorial Local Authority in which activity is situated?

- Dunedin City Council
- Queenstown Lakes District Council
- Clutha District Council
- Waitaki District Council
- Central Otago District Council

11. *Do you require any other resource consent from any local authority for this activity?

- Yes
- No

If Yes, please list: _____

_____

Have these consents been applied for/issued? . Yes . No

If Yes, please give the date applied for or issued: _____

Notes on Application Form Details

1. **Applicant(s) Details**

A resource consent can only be held by a legal organisation or fully named individual(s). A legal organisation includes a limited company, incorporated group or registered trust. If the application is for a trust the full names of all trustees are required. If the application is not for a limited company, incorporated group or trust, then you must use fully named individual(s).

2. **Consultant/Contact Details**

If you are using a consultant/agent for this application put their details here. If you are not, leave question 2 blank.

3 **Previous Consent**

Do you currently have a resource consent to do the activity that you are applying to renew with this application? If so, please enter the permit number if known and a brief description including the date of issue and the expiry date.

5-7 **Landowner, occupier and leasee**

If you are not the landowner, land occupier or leasee of the land where the activity will be undertaken, you may be required to obtain their unconditional written approval to your application. On pg 6 there is a form that can be used.

11. **Additional Consents**

If you are carrying out earthworks or building work you may need other consents from either the ORC or your Territorial Local Authority.

Declaration

Before signing the declaration below, in order to provide a complete application have you remembered to:

Fully completed this Form 1 and the necessary Application Forms

Attached the required deposit. (see pg 8 for amounts)
Cheques payable to Otago Regional Council

Please note: your deposit may not cover the entire cost of processing your application. At the end of the application process you will be invoiced for any costs that exceed the deposit. Interim invoices may be sent out for applications, where appropriate.
If the required deposit does not accompany your application, staff will contact you on the number provided on this form to request payment and after 3 working days your application will returned if no further payment is made for the required deposit.

I/we hereby certify that to the best of my/our knowledge and belief, the information given in this application is true and correct.

I/we undertake to pay all actual and reasonable application processing costs incurred by the Otago Regional Council.

Name/s _____
(BLOCK CAPITALS)

Signature/s _____
(or person authorised to sign on behalf of applicant)

Designation _____ Date _____
(e.g., owner, manager, consultant)

Otago Regional Council Postal Address: 70 Stafford St, Private Bag 1954, Dunedin 9054

Otago Regional Council

Written Approvals of Persons Likely to be Adversely Affected

I/We (Please print full name/s)__________________________________

of (Address) ____

have studied the proposal by (Applicant) ______________________________

for a Resource Consent (Number) ____________________ to __________________

____

and give my/our written approval to the proposed activity/activities.

Signature/s__________________________________ Date ________________
(or person authorised to sign on behalf of affected party/parties)

Phone ____________ Fax ____________ Email ____________________________

Please note: If this application is subsequently notified the above approval does not constitute a submission as required under Section 96 of the Resource Management Act 1991.

I/We (Please print full name/s)__________________________________

of (Address) ____

have studied the proposal by (Applicant) ______________________________

for a Resource Consent (Number) ____________________ to __________________

____

and give my/our written approval to the proposed activity/activities.

Signature/s__________________________________ Date ________________
(or person authorised to sign on behalf of affected party/parties)

Phone ____________ Fax ____________ Email ____________________________

Please note: If this application is subsequently notified the above approval does not constitute a submission as required under Section 96 of the Resource Management Act 1991.

I/We (Please print full name/s)__________________________________

of (Address) ____

have studied the proposal by (Applicant) ______________________________

for a Resource Consent (Number) ____________________ to __________________

____

and give my/our written approval to the proposed activity/activities.

Signature/s__________________________________ Date ________________
(or person authorised to sign on behalf of affected party/parties)

Phone ____________ Fax ____________ Email ____________________________

Please note: If this application is subsequently notified the above approval does not constitute a submission as required under Section 96 of the Resource Management Act 1991.

Consultation

Under Section 95E of the Resource Management Act 1991 (the Act) the Council will identify affected parties to an application and if the application is to be processed on a non-notified basis the unconditional written approval of affected parties will be required. Consultation with potentially affected parties and interested parties can be commenced prior to lodging the application.

Consultation may also be required with the appropriate Tangata Whenua for the area. The address of the local Iwi office is: Kai Tahu ki Otago Ltd, 258 Stuart Stree, P O Box 446, Dunedin, Fax (03)477-0072, Phone (03) 477-0071, email: info@ktkoltd.co.nz. If you require further advice please contact the Otago Regional Council.

Good consultation practices include:

- Giving people sufficient information to understand your proposal and the likely effects it may have on them
- Allowing sufficient time for them to assess and respond to the information
- Considering and taking into account their responses

Information Requirements

In order for any consent application to be processed efficiently in the minimum time and at minimum cost, it is critical that as much relevant information as possible is included with the application. **Where an application is significantly incomplete, the Consent Authority may decide not to accept the application for processing.**

An application for a resource consent must include an Assessment of Effects as outlined in the Fourth Schedule of the Resource Management Act 1991 and reproduced below. The extent of detail required should be relative to the scale and significance of the potential adverse effects the activity may have on the receiving environment.

Resource Management Act 1991
FOURTH SCHEDULE—ASSESSMENT OF EFFECTS ON THE ENVIRONMENT

1. **Matters that should be included in an assessment of effects on the environment –**
Subject to the provisions of any policy statement or plan, an assessment of effects on the environment for the purpose of section 88(6)(b) should include:
(a) A description of the proposal.
(b) Where it is likely that an activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity.
(c) Repealed, as from 7 July 1993, by s 225 Resource Management Act 1993 (1993 No 65).
(d) An assessment of the actual or potential effect on the environment of the proposed activity.
(e) Where the activity includes the use of hazardous substances and installations, an assessment of any risks to the environment which are likely to arise from such use.
(f) Where the activity includes the discharge f any contaminant, a description of:
(i) The nature of the discharge and the sensitivity of the proposed receiving environment to adverse effects; and
(ii) Any possible alternative methods of discharge, including discharge into any other receiving environment:
(g) A description of the mitigation measures (safeguards and contingency plans where relevant) to be undertaken to help prevent or reduce the actual or potential effect.
(h) An identification of those persons interested in or affected by the proposal, the consultation undertaken, and any response to the views of those consulted.
(i) Where the scale or significant of the activity's effect are such that monitoring is required, a description of how, once the proposal is approved, effects will be monitored and by whom.

2. **Matters that should be considered when preparing an assessment of effects on the environment** – Subject to the provisions of any policy statement or plan, any person preparing an assessment of the effects on the environment should consider the following matters:

(a) Any effect on those in the neighbourhood and, where relevant, the wider community including any socio-economic and cultural effects.
(b) Any physical effect on the locality, including any landscape and visual effects.
(c) Any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity.
(d) Any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural, or other special value for present of future generations.
(e) Any discharge of contaminants into the environment, including any unreasonable emission of noise and options for the treatment and disposal of contaminants.
(f) Any risk to the neighbourhood, the wider community, or the environment through natural hazards or the use of hazardous substances or hazardous installations.

Set out below are details of the amounts payable for those activities to be funded by fees and charges, as authorised by s36(1) of the Resource Management Act 1991.

Resource Consent Application Fees (from 1 July 2012)

Note that the fees shown below are a **deposit** to be paid on lodgement of a consent application and applications for exemptions in respect of water metering devices. This deposit will not usually cover the full cost of processing the application, and further costs are incurred at the rate shown in the scale of charges. GST is included in all fees and charges.

Publicly Notified Applications: [3]	**$**
First application	5,000.00
Concurrent applications	225.00

Non Notified Applications and Limited Notified Applications: [3]	**$**
First application (except those below)	1,000.00
Concurrent applications [1]	50.00
Administrative variation	500.00
Exemptions from water measuring Regulations	200.00
Bores	500.00
Gravel	500.00
Hearings	Per Note 2 below

Transfers and Certificates Deposits:	**$**
Transfer of Mining Privilege	100.00
Transfer – other	100.00
Priority Table	100.00
Section 417 Certificate	200.00
Certificate of Compliance	200.00
Section 125 – Extension of Term	100.00
All Other Costs	As per Scale of Charges

Scale of Charges:	**From 1 July 2012** **$**
Staff time per hour:	
* Executive staff	235.00
* Senior Technical/Scientist	147.00
* Technical/Scientist	94.00
* Administration	77.00
Disbursements	Actual
Additional site notice	Actual
Advertisements	Actual
Vehicle use per kilometre	0.70
Travel and accommodation	Actual
Testing charges	Actual
Consultants	Actual

Notes

1. For additional permits in respect of the same site, activity, applicant, time of application, and closely related effect as the first application.

2. The deposit payable shall be 90% of the cost of a hearing as calculated by Council in accordance with information contained in the application file and using the scale of charges. The amount payable will be due at least 10 working days before the commencement of the hearing. If the amount is not paid by the due date, then the Otago Regional Council reserves the right under S36 (7) of the Resource Management Act to stop processing the application. This may include cancellation of the hearing.

   Should a hearing be cancelled or postponed due to the non payment of the charge, the applicant will be invoiced for any costs that arise from that cancellation or postponement.

   Following completion of the hearing process, any shortfall in the recovery of hearing costs will be invoiced, or any over recovery will be refunded to the applicant.

   Under Section 100A of the RMA, one or more submitters may make a request to have a resource consent application heard by one or more hearing commissioners who are not members of Council. In this case the applicant will pay the amount that Council estimates it would cost for the application to be heard had the request not been made, and the submitter(s) who made the request will pay, in equal shares, the cost of the application being heard that exceeds that amount payable by the applicant.

   Further, the applicant may request to have a resource consent application heard by one or more hearing commissioners who are not members of Council. In this case, the applicant will pay the full costs.

3. Where actual and reasonable costs are less than the deposit paid, a refund will be given.

Review of Consent Conditions

Following the granting of a consent, a subsequent review of consent conditions may be carried out at either request of the consent holder, or, as authorised under Section 128, as a requirement of Council. Costs incurred in undertaking such reviews will be payable by the consent holder at the rates shown in the Scale of Charges above.

Compliance Monitoring Charges (from 1 July 2012)

1. Performance Monitoring

The following charges will apply to the review of performance monitoring reports for all consent holders, except those listed in section 1.4 below. The charges shown are annual fixed fees per performance monitoring report or plan, and are inclusive of GST.

			From 1 July 2012
1.1 Discharge to Air Consent			**$**
Measurement of contaminants from a Stack report			38.50
Ambient air quality measurement of contaminants report			66.50
Management plans and maintenance records			33.50
Annual Assessment report			66.50
1.2 Discharge to Water, Land and Coast			**$**
•	Effluent Systems	Environmental Quality report	31.00
•	Active Landfills	Environmental Quality report	38.50
		Annual Assessment report	87.00
		Management Plans	174.00
•	Closed Landfills	Environmental report	23.00
		Annual Assessment report	23.00
		Management Plans	87.00
•	Stormwater	Environmental Quality report	20.50
		Management Plans	87.00
•	Industrial Discharges	Effluent quality report	28.00
		Environmental report	61.50
		Annual Assessment report	77.00
		Management Plans	174.00
1.3 Water Takes			
Calibration data reports			13.00
Manual return of data per take			66.50
Datalogger return of data per take			23.00
Telemetry data per consent			33.50
Low flow monitoring charge*			
- Kakanui at McCones			327.00
- Unnamed Stream at Gemmels			1,431.00

*Charge for monitoring sites established by the ORC specifically to monitor consented activities in relation to river flows.

1.4 Set Fees for Specific Consent Holders

Performance monitoring fees as shown below will apply to the following consent holders:

Dunedin City Council	$15,890.00
Central Otago District Council	$5,409.00
Clutha District Council	$8,358.00
Queenstown Lakes District Council	$7,629.00
Waitaki District Council	$5,753.00
Ravensdown	$5,742.00
Contact Energy	$4,262.00
Trustpower	$3,381.00
Pioneer Generation	$2,792.00

2. Audit

Audit work will be charged at half of the actual cost incurred, with the actual costs being calculated using the Scale of Charges.

3. Non-Compliance, Incidents and Complaints

Enforcement work on consent conditions, and remedying negative effects from permitted activities – Scale of Charges.

4. Consent Establishment Inspections

One off inspection by Council on establishment work carried out by consent holders – $155.00 (incl. GST)

Gravel Inspection and Management

Gravel extraction fee – $0.66 per cubic metre (incl. GST). Where more than 10,000 cubic metres of gravel is extracted within a prior notified continuous two month period, the actual inspection and management costs will be charged, as approved by the Director Corporate Services.

ASSESSMENT OF ENVIRONMENTAL EFFECTS

1. Introduction

The applicant, Criffel Water Limited ("CWL"), wish to obtain consent to continue to take water from North Branch of the Luggate Creek. Criffel Water Limited is a company that has been formed by the seven people who currently hold mining licences or deemed permits to take water from the Criffel Weir. Those people seek consent for a single water take and it is intended that the allocation of the water between company shareholders will then be managed by the Company ("The Criffel Scheme". A table setting out the existing mining privileges and deemed permits held by shareholders of Criffel Water Limited is attached at **Appendix 1.**

Consent is being sought to take water at a rate of 601.8l/s, for irrigation purposes, stock water supply and hyro-generation. This is the same volume of water provided for under the existing permits. This volume has been utilised historically and there is sufficient irrigable land within the command area for the Criffel Scheme to fully utilise this volume.

Currently much of the land within the command area is irrigated by flood irrigation, with some spray irrigation. It is anticipated that over a period of time new and more efficient irrigation methods (including possible storage) will be employed. However, the capital expenditure required to achieve this cannot be justified until such time as access to the necessary water rights is secure.

The applicant is also seeking consent to take water outside of the usual irrigation season to provide stock water and for hydro-generation purposes.

This application is supported by *"Criffel Water Limited – Luggate Creek – Irrigation Volumes & Rate of Take" "Criffel Water Limited – Hydro-electricity Addendum to Report of 19 June 2015* prepared by David Hamilton and Associates and attached as part of this assessment (referred to hereafter as "the Hamilton Report"). A Resource Consent Application Form 4, also prepared by David Hamilton is also included. These documents are attached at **Appendix 2 and 3.**

1.1. The Applicant

Applicant Address:	Consultant Address:
Criffel Water Limited c/o Gallaway Cook Allan 276 Princess Street Dunedin Central Dunedin 9016	Gallaway Cook Allan PO Box 143 Dunedin 9054 Email: phil.page@gallawaycookallan.co.nz bridget.irving@gallawaycookallan.co.nz Phone: 03 477 7312

2. Description of Existing Environment

2.1. Site Location, Topography and Land Use

The properties are located halfway between Luggate and Wanaka. The legal descriptions of the properties are attached at **Appendix 4** along with the relevant Certificates of Title. The combined properties total some 1500 hectares.

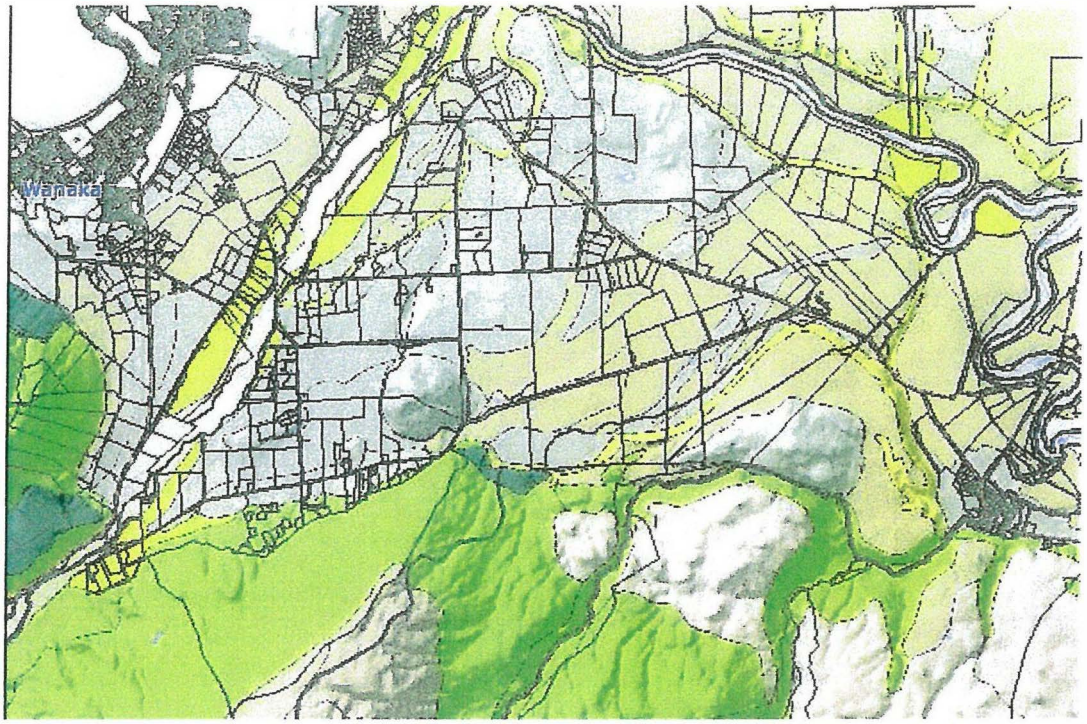
The command area of the scheme is a combination of relatively flat to rolling pasture and hill country. Activities undertaking within the command area is predominately traditional pastoral farming (including some cropping), with smaller areas of horticulture and dairy support. The existing Irrigation facilitates better pasture growth and crop development. Future development and employment of more efficient irrigation techniques will extend the land area under irrigation which will further improve the productivity of the command area.

Currently approximately 900ha is irrigated using existing irrigation methods. Future development of more efficient irrigation infrastructure will allow a further 300ha to be irrigated. There is sufficient irrigable land within the command area to efficiently use all of the water sought.

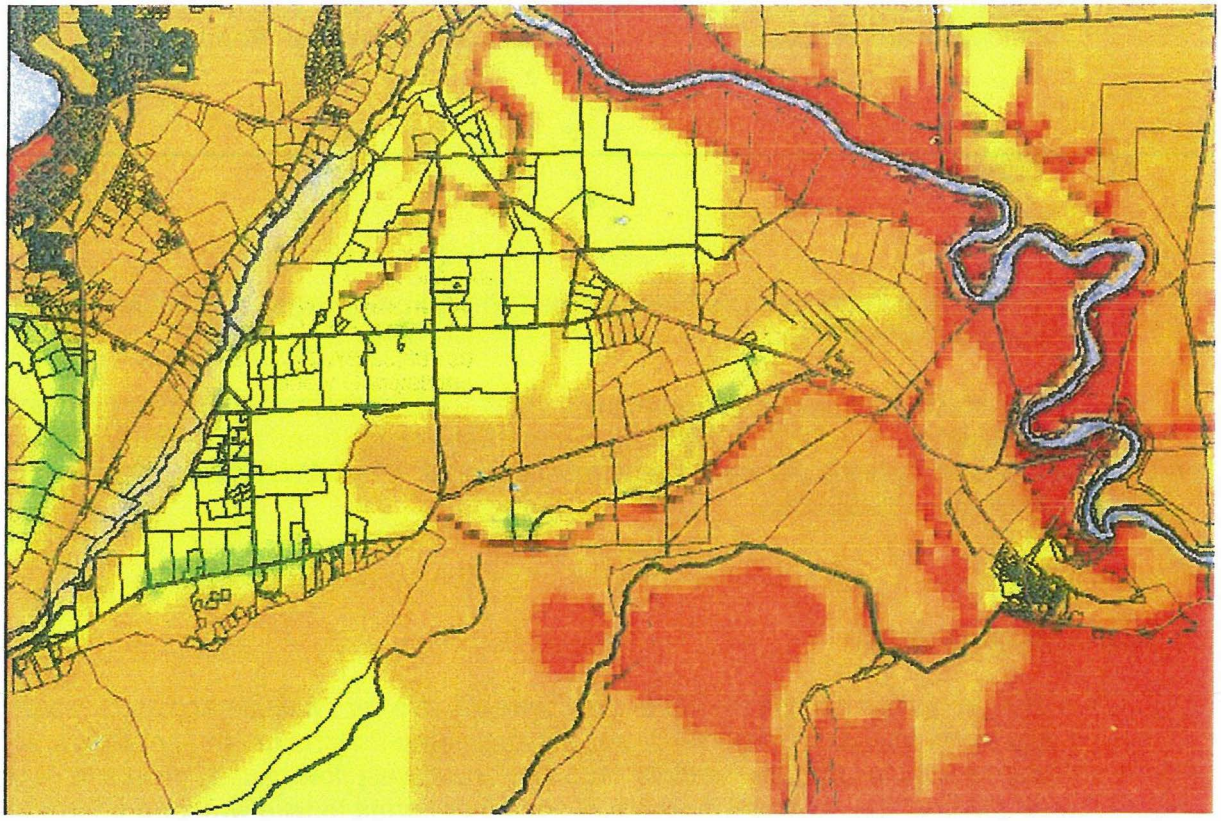
In 1967 members of the informal Criffel Scheme joined together to construct the Criffel Weir which continues to be the take point for the Criffel Scheme. The Weir is located at NZMS 260:F40:100999. The Weir has been further authorised by resource consent 2007.656 and 2010.056. Copies of those consents are attached at **Appendix 5.**

2.2. Soils

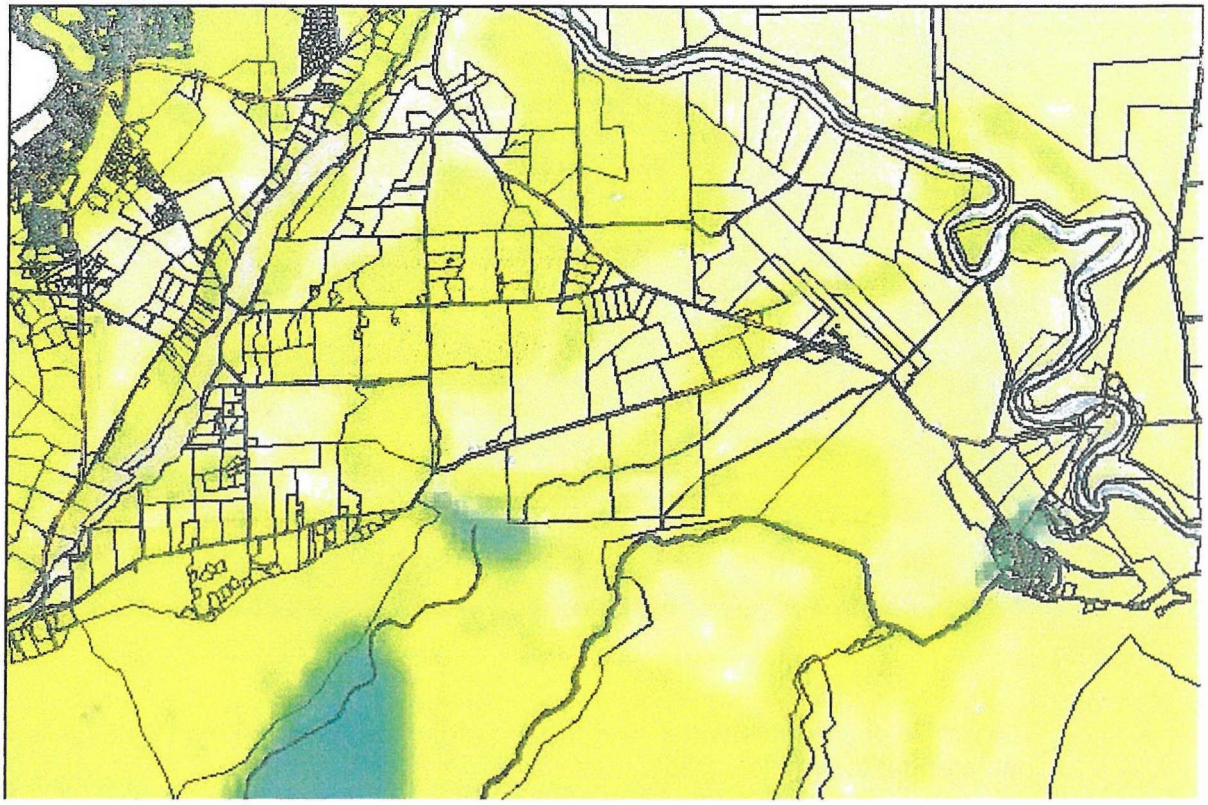
The growOtago soil map show the property as comprising of a number of different soil types – being Melanic, Brown, Pallic, Organic and Recent Soils. These soils are described as being from a variety of series – Wanaka, Luggate, Gladbrook, Cluden, Shotover, Koinga, Conroy, Arrow and Blackstone, with a shallow to moderate depth and terrain ranging from steep to rolling to undulating.



The Profile of available water over the properties ranges from moderate (yellow) to low (orange) to very low (red).



The drainage across all properties ranges from well drained to imperfectly drained.



The implications of the soil characteristics and the water volumes required to efficiently are set out at section 6.3 and 6.4 of the Hamilton Report.

2.3. Climate

The average annual rainfall tends to be 651-700mm rising to 801-900mm on higher parts of the site.

The median annual air temperature is 10.1° – 10.5°C, with the summer median between 16.1° – 16.5°C. Growing Degree Days range from 1401 – 2200 (5°C base). In March/April the potential evapotranspiration is 71 – 85mm up to 220mm in November/December.

2.4. Surface Water

The properties access the water they currently use for irrigation and stock water from the North Branch of Luggate Creek. It is estimated that the mean annual flow at the intake point in Luggate Creek is 1183 L/s. The lowest flow usually occurs in February at 392 L/s. The applicant is aware of one other permit to take water from the North Branch of the Luggate Creek which is held by Luggate Irrigation Company Ltd (WR7284CR, Privilege Number 1496). This permit has a take point located down stream from the Criffel Weir and is not part of the Criffel Scheme.

Modelling of the Luggate Catchment was carried out by the ORC in 2006 to assess the flows required to sustain aquatic habitat. [1] This report modelled the 7-day mean annual low flow to be 454 – 550 L/s and the actual flow to be 377 L/s due to irrigation takes.

The report states that there is currently 987 L/s primary allocation above the measurement point (which is located at the SH6 Bridge at Luggate township). This allocation can affect flows when the river is at its 7-day mean annual low flow. Minimum flows to protect the ecological values of the Luggate Creek have been determined as follows:

Low Flow Period (November to April)	180l/s
High flow Period (May to October)	500l/s

A Primary Allocation limit of 500l/s for the catchment has also been determined in accordance with Policy 6.4.2(a). However, a primary allocation limit of 987l/s is determined in accordance with 6.4.2(b). Under that policy the greater of the two applies. No supplementary allocation block has been set.

3. Description of Proposed Activities

3.1. Overview of Activities

Consent is sought to take surface water for irrigation, stock drinking water purposes and hydro generation. The water is to be abstracted in the same manner as already occurs via the Criffel Weir and under mining privileges and deemed permits held by the Criffel Scheme members. Consent is therefore sought under Rule 12.1.4.4 of the Regional Plan: Water as a restricted discretionary activity.

3.2. Proposed Timeframes and Duration

The applicant seeks to obtain consent for a 35 year duration. In addition, the applicant seeks that the consent not commence until 2 October 2021 being the day after the mining privileges and deemed permits held by the scheme members have expired.

3.3. Water Permit for Irrigation

Consent is sought to extract water to ultimately allow approximately 1,200 ha of land to be irrigated. Existing deemed permits and mining privileges allow a flow of 601.8 L/s to be taken. This volume of water is the same amount requested by this application.

The Hamilton Report states that the recommended monthly limit for pasture varies between 1,200 and 1,575m^3/month/ha. The recommended seasonal limit varies between 5775 and 6750m^3/hectare. The actual spray irrigation systems in Central

[1] ORC, Management Flows for Aquatic Ecosystems in the Luggate Creek, August 2006 ("ORC Luggate Report")

Otago are often sized on a peak flow rate of 0.5l/s per ha which delivers a gross application figure of 4.3mm/day. Existing applications and the Aqualinc recommendations provide for slightly more than this, particularly on shallower soils.

The flow rate sought (601.8) provides for 1,559,952m^3/month to be taken. This is slightly less than the volume calculated using Aqualinc, which provides for 1,652,313m2/month.

3.4. Water Permit for stock water

As outlined in the Hamilton Report it is also necessary to make an allowance for stock water supply. This needs to be over and above the volume sought for irrigation purposes. This is discussed at paragraph 6.5 of the Hamilton Report. During the irrigation season stock water supply is easily provided with irrigation supply as races are already running. The Hamilton Report estimates that 1,866,240m^3 will be required during the irrigation season. However, during the winter (May-August) when irrigation flows are not in the races higher water volumes are required to ensure water can be driven to the individual properties. As a result 1,600,00m^3 is required during this period.

A total of 3,500,000m^3 is therefore required in order to ensure adequate stock water is available.

3.5. Water Permit for Hydrogeneration

As discussed earlier it is intended that once water supply is secure it will enable further capital development to upgrade the irrigation systems to improve the efficiency of both the transport system (race network) and the irrigation methods (move from flood irrigation to spray). This is likely to also involve some storage development to improve reliability. The feasibility of this infrastructure would be improved if it could also be used for hydro-generation. Storage ponds would allow generation to occur at times of peak demand. Peak electricity demand also occurs during the winter months when water flows within Luggate Creek are at their highest.

Providing for water to be taken for hydro generation allows for a fully integrated system to be developed that maximises the value that can be created from the water that is taken.

4. Statutory Matters

The area is controlled by a series of documents, namely the Regional Policy Statement for Otago (RPS), the Regional Water Plan for Otago, Kai Tahu ki Otago Natural Resource Management Plan and the Resource Management Act 1991.

4.1. National Policy Statement for Freshwater

The application is considered to be consistent with the objectives of the NPS for Freshwater. Particularly Objectives B3 which seeks to improve and maximise the efficient use of water. An assessment of the proposal against the relevant provisions is attached at **Appendix 6.**

4.2. National Policy Statement for Renewable Electricity Generation

The application is considered to be consistient with the objectives and policies of the NPS for renewable generation. An assessment of the proposal against the relevant provisions is attached at **Appendix 6.**

4.3. Regional Policy Statement

The application is considered to be consistent with the RPS, and, in particular, Objectives 6.4.1, 6.4.2 and 6.4.8 and Policies 6.5.2 and 6.5.3. An assessment of the proposal against the relevant provisions is attached at **Appendix 6.**

Given that the proposed regional policy statement has been notified an assessment against this document has also been completed and included in **Appendix 6.**

4.4. Regional Plan: Water

The objective, policy and rule framework for the Regional Plan: Water for Otago (RPW) recognises the importance of the integrated and sustainable management of Otago's water resources. The plan is aimed at enabling the use and development of water where this can be undertaken in a sustainable manner, providing a framework for activities such as discharges to water, taking and using water, and structures and bed disturbance activities in riverbeds. The RPW became operative in May 2014 following Council resolution.

The RPW identifies the significant resource management issues and objectives of particular relevance to the Region. The specific policies and objectives in relation to the groundwater take are outlined in section 6 of the RPW and include aims to ensure allocation is sufficient, within defined parameters, will not compromise surfacewater quality and respect other water users. It is considered that the amount of water proposed to be abstracted is reasonable for the volume of water required for the applicant's purposes and no different to that already provided for.

The applicant seeks to take water at a rate equal to that authorised under the deemed permits and mining privileges held by its constituent members. The maximum rate that is proposed to be taken is higher than the water actually taken in the previous 5 years. Policy 6.4.2A states that no more water than has been taken in the last 5 years should be provided consent. The policy is focused on the efficient use of water. The principle reasons that this policy was adopted is to ensure that conflict between users is minimised and that underutilised primary allocations are reduced in order to lower the supplementary minimum flows.

The applicant was incorporated to efficiently distribute the water resources amongst its members. The reduction of conflict amongst water users from the Luggate is achieved by this incorporation. There is only one other party that takes water from the Luggate, downstream from the applicant's take. The conditions of dam permit 2007.676 ensure that the other party taking from the Luggate has sufficient water to exercise their resource consent. The incorporation combined with the applicant's provision of water to other users ensures that conflict between those taking water is minimised.

Due to the primary allocation of water in the Luggate Catchment there is no supplementary allocation available. If supplementary allocation were available, it

would only be available in times when the Luggate is in high flow. This remains the case should a rate of take consistent with the previous 5 years take be consented. A reduction of authorised rate of take will not allow the supplementary minimum flow to be lowered because the primary allocation in the Luggate does not allow for any supplementary allocation. Furthermore, there is no merit in authorising supplementary allocation on the Luggate, because:

i) there is only one other user; and

ii) the current allocations would not allow any potential new takes to obtain supplementary allocation. This removes the viability of any new takes and suggests that there will be no possibility for additional takes beyond those currently.

Any reduction of the rate of take based on the previous 5 years would result in limited benefit for the Luggate, and would be detrimental to the applicant due to reduced potential use of the water. The policy suggests that historic use will be equivalent to future use. This is not correct. In the case of a new water take, the efficiency of the proposed infrastructure and utilisation of the water will be taken into account. The decision to allocate water would be based on future potential. The same logic should apply to this application. The applicant is proposing significant infrastructural upgrades. This will ensure the efficient utilisation of the water.

Disregarding the volume taken in the last 5 years would, in this case, meet the purpose of the policy better than strict adherence to it. The incorporation of the applicant reduces conflict amongst those taking water from the Luggate. Granting consent to the applied take will allow infrastructural upgrades to occur ensuring absolute utilisation of the water. The minimum flow of the Luggate will be maintained in order to ensure environmental sustainability. The potential benefit that can be achieved through the water combined with the applicant's commitment to ensure efficiency upgrades means the 5 year "use it or lose it" requirement of policy 6.4.2A should not apply.

Overall, the proposal is assessed as being consistent with the objectives and policies of the Regional Plan: Water. An assessment of the proposal against the relevant provisions is attached at **Appendix 7**.

4.5. Kai Tahu ki Otago

The proposed application has had regard to specific policies and objectives within the Kai Tahu Ki Otago Natural Resource Management Plan. The proposal is considered to be generally consistent with those objectives and policies contained within the Plan. An assessment of the proposal against the relevant provisions is attached at **Appendix 7**.

4.6. Resource Management Act 1991

A decision on discretionary resource consent applications must be made in accordance with the purpose and the principles of the RMA (Part 2) and must have regard to the matters set out in section 104 of the Act.

(a) **Purpose and Principles of the RMA (Part 2)**

Part 2 of the Act sets out the purpose and principles of the Act. The purpose of the Act is the sustainable management of natural and physical resources.

not aware of any new water permits being granted for the Luggate Catcment and so assumes that the maximum consented takes is 987l/s as identified in the ORC's report.

The applicant is seeking consent for a take of 601.8l/s which is within the allocation limit for the catchment under policy 6.4.2(b).

(ii) *Whether the proposed take is primary or supplementary allocation for that catchment.*

The proposed take is for primary allocation.

(iii) *The rate, volume, timing and frequency of water to be taken and used.*

The proposed rate, volume and frequency is as follows:

Maximum take rate:	601.8l/s	
Take volume per day:	51,995m3	
Take volume per week:	363,968m3	
Take volume per month:	1,559,866m3	
Take volume per Year	7,249,775m3 – irrigation 8,228,225m3 - hydro 350,000m3 – stock water **18,978,000m3 - Total**	All year

(iv) *The proposed methods of take, delivery and application of the water taken.*

The water take will be through the existing weir, through a 680mm internal diameter concrete pipe to a flow splitter and then along an open race network to the various properties served by the scheme. Currently water is applied using various methods including border dyke, k-line, travelling irrigator and pivots. It is expected that over time landowners will move to more efficient application techniques. Water storage options are also being considered to improve the reliability of the scheme.

It is also intended to develop hydro generation infrastructure so that all water taken can also be used to generate electricity. When irrigation is not occurring this will be a non-consumptive use with the water ultimately being returned to the Clutha River as would otherwise occur. The multi faceted development ensures that maximum value is being obtained from the water being taken.

(v) *The source of water available to be taken.*

All water taken will come from the North Branch of the Luggate Creek. The values of the Luggate Creek have been fully assessed by the ORC Report and minimum flows set to protect the ecosystem functioning of the Creek. The consent will be subject to the minimum flow regime and as such the natural and recreational values of the Creek are protected.

(vi) *The location of the use of the water when it will be taken out of a local catchment.*

N/A

(vii) *Competing and lawful local demand for that water.*

The applicant is aware of one other permit to take water from the North Branch of Luggate Creek. It is held by Luggate Irrigation Company Ltd and is for 200,000l/hr (WR7284CR Privilege number 1496). The resource consent allowing the Criffel Weir requires at least 50l/s to pass through the Weir in order to provide for that take. In reality almost 100l/s passes through the weir which is adequate to ensure the downstream take held by Luggate Irrigation Company Limited is not derogated from.

(viii) *The minimum flow to be applied to the take of water, if consent is granted.*

Schedule 2A of the Otago Regional Plan identifies the minimum flow for the Luggate Catchment is 180l/s from November to April and 500l/s May to October. The minimum flow is to be measured at the SH6 Bridge at Luggate township. This consent, if granted will be subject to the minimum flow regime. As mentioned about the minimum flow has been set to protect the ecosystem values of the Luggate Creek. As the consent will be subject to the minimum flow regime those values are adequately protected if consent if granted.

(ix) *Where the minimum flow is to be measured if consent is granted.*

The measurement point for the Luggate Creek is at the SH6 Bridge at Luggate township. This measurement point is below the confluence of the North and South branches of the Luggate Creek.

(x) *Any need for a residual flow at the point of take.*

The diversion consent for the Criffel Weir (2007.656, 2010.056) includes a condition that requires at least 50l/s pass over the Weir as residual flow. This ensures that down stream takes are not derogated from. This is considered appropriate and will continue. Flow testing undertaken in preparation for filing this application indicates that more than 50l/s is being passed through the Weir.

No further residual flow requirements are necessary and the consent will also be subject to the minimum flow regime which is sufficient to protect the ecosystem values of the Luggate Creek.

(xi) *Any need to prevent fish entering the intake and to locate new points of take to avoid adverse effects on fish spawning sites.*

This is not a new intake. Effects are already addressed through the existing consent to dam the North Branch and form the Criffel Weir. In reality the Weir

structure is likely to have some benefits for native fish populations by acting as a barrier for trout travelling upstream.

(xii) *Any actual or potential effects on any groundwater body.*

N/A

(xiii) *Any adverse effect on any lawful take of water, if consent is granted, including potential bore interference.*

As previously mentioned the consent authorising the Criffel Weir provides for no less than 50l/s of residual flow through the weir that protects the rights of downstream users. There are no adverse effects on other lawful takes.

(xiv) *Whether the taking of the water under a water permit should be restricted to allow the exercise of another water permit.*

As previously mentioned the consent authorising the Criffel Weir provides for no less than 50l/s of residual flow through the weir that protects the rights of downstream users. The consent will also be subject to the minimum flow regime. These requirements in combination are adequate to allow other permits holders in the catchment to exercise their rights.

(xv) *Any arrangement for co-operation with other takers or users.*

Criffel Water Limited has been incorporated for the purpose of managing the water used by land owners within the Command Area of the Criffel Irrigation Scheme. This Scheme was developed in the 1960's and had operated on a relatively informal basis ever since. The incorporation of the applicant company will provide some formality to this previously informal scheme and ensure ongoing co-operation of scheme members. It is proposed that all water take and usage should be authorised through one resource consent. This will make matters such as compliance and enforcement simpler for the Otago Regional Council.

(xvi) *Any water storage facility available for the water taken and its capacity.*

The applicant is investigating possible storage options for the scheme. It is likely that some small scale storage will be developed in order to develop capacity for gravity fed spray irrigation. Larger storage may also be developed to improve the reliability of the scheme in drier seasons. Storage systems will also provide further opportunities to develop hydro generation that can maximise the value of the water taken and provide electricity supply at times of peak demand.

(xvii) *Duration of the resource consent.*

The application seeks a term not exceeding 35 years from the date of commencement which is requested to be 2 October 2021.

(xviii) *The information, monitoring and metering requirements.*

The scheme take is currently measured at the splitter box downstream of the intake point. An exemption was granted in 2014, reference WEX0162.

(xix) *Bond.*

N/A

(xx) *The review of conditions of the resource consent.*

The applicant is aware that the Council has the ability to review conditions of consent should unanticipated effects arise. As this application is effectively a renewal of mining privileges and deemed permits it is submitted that there will no unanticipated effects. Given that a review condition is not considered necessary.

5.2. The proposed consent once commenced will have a net benefit to the Luggate Creek catchment because the take will become subject to the minimum flow regime. Mining privileges and deemed permits are not subject to that regime. Therefore effects on the ecosystem values of the Luggate Creek will be protected.

5.3. The scale and significance of the water take activity is no different from current activities and application of the minimum flow regime will ensure that any adverse effects of the take on the values of the Luggate Creek are effectively managed. The activity will have no new landscape or visual effects from currently. Granting the consent will have positive effects for the shareholders of the applicant company as it will provide security of supply for them and the ability to make investment and land development decisions based on certainty of water supply. This will allow further land to be irrigated as scheme members undertake infrastructure upgrades and an increase in agricultural production. Hydro generation capacity is also being considered which will improve the feasibility of installing storage capacity and improve the efficiency of the water use by providing multiple opportunities for value to be generated from it. This will improve the economic sustainability of the scheme members and the flow on benefits this has to the community.

6. Consultation with Affected Parties

No person or party is considered to be adversely affected by this application. Because the consent will be subject to the minimum flow regime the ecological/recreational values of the Luggate Creek are protected therefore no consultation is required.

Residual flows which are secured by the Criffel Weir permits also protect the interests of downstream users such that no further consultation or approvals are required.

7. Notification

The effects of the proposed application are considered to be no more than minor and there are no affected parties. The application is in essence a renewal for activities that already occur. On that basis it is considered that the application can be processed on a non-notified basis.

8. Summary

The applicant seeks consent to take water at a maximum instantaneous rate of 601.8l/s and a maximum annual volume of 18,978,000m^3. The proposed take is all within the primary allocation limit for the catchment as it is less than the sum of the consented takes for the Luggate Catchment. The proposed consent will be subject to

the minimum flow regime for the Luggate Creek and as such the ecological and recreational values of the catchment are appropriately protected. The take point is an already established Weir. Consent authorising the weir includes a residual flow condition that protects the rights of downstream water users to take water.

Granting the proposed consent will provide scheme users with water supply security and provide a catalyst for capital development that will improve the efficiency of the water use within the Criffel Scheme. Such investment will increase the land area that can be irrigated by the water taken and provide opportunities to more efficiently use the water through development of hydo-generation. This will in turn have benefits in improving the economic sustainability of the scheme members and the wider community.

The effects associated with the proposal are considered to be no more than minor, the proposal overall is consistent with the objectives and policies of the relevant statutory documents and with the purpose of the Act.

TABLE SETTING OUT WATER TAKES ON NORTH BRANCH LUGGATE CREEK ACCORDING TO PRIORITY

Historic Water Race Permit	Current Deemed Permit Number	Current Permit Holder	Volume (l/hr)	Legal Description	Point of take
WR359cr Renewal Number 2585B Date: 9 Sept 1887 Volume: 400,000L/hr WR359CR allocates 600,000l/hr in two parts	94201	Corbridge Park Ltd as partner of Corbridge Est Ltd Partnership	50,000	Sec 65 and Pt Sec 64 Blk IV Lwr Wanaka SD, Sec 1 Blk II Lwr Wanaka SD and Sec 66-67 Blk IV Lwr Wanaka SD	Luggate Creek approx. 2.6km SE of Mt Barker Rd and Boundary Road Intersection (NZMS 260:G40:101-995
	95541	JA Feint and MC Feint	66,000	Lot 2, 3, 5 DP 20109, Section Part 7, Block II, Cardrona SD	(NZMS 260:G40:101-995
	95560	Alexander Rowley Morris	132,000	Not specified	Reserve Adjacent to Pt Sec 5, Blk XIII Cardrona SD (NZMS 260:G40:101-995
	96588	George R Wallis ½ share and JW and JR Cooper ½ share	132,000	Not specified	sec 3 SO 300466, Luggate Creek approx. 3.6km SW of SH6 and Mt Barker Rd (NZMS 260:G40:101-995
	2001.011.V1	David Stanley Allen	33,000	Not specified	Pt Sec 5 Blk XIII Cardrona SD (NZMS 260:G40:101-995

TABLE SETTING OUT WATER TAKES ON NORTH BRANCH LUGGATE CREEK ACCORDING TO PRIORITY

Historic Water Race Permit	Current Deemed Permit Number	Current Permit Holder	Volume (l/hr)	Legal Description	Point of take
WR7284CR Privilege Number 1496 Date: 9 Dec 1897 Volume 200,000	N/A	Luggate Irrigation Company Limited	200,000	Not specified	At point in Nth Branch of Luggate Creek at Intake of WR1496
WR2579/98 Renewal Number 3296A Date: 18 Dec 1898 Volume: 800,000L/hr	97629_v1	Jeremy Bell Investments Limited	800,000	Not specified	River Reserve btwn Run 625 + Sec5, Blk XIII, Cardrona SD Luggate Creek 5.5km upstream of Luggate Domain (NZMS 260:G40:101-998)
WR412Cr Date: 11 May 1900 Volume: 700,000L/hr (original licence provided for 10 sluice heads) [t]	N/A	Jeremy Arthur Bell	700,000	Not specified	Commencing at point in Nth Branch of Luggate Creek about a mile above the junction of the north and south branches

TABLE SETTING OUT WATER TAKES ON NORTH BRANCH LUGGATE CREEK ACCORDING TO PRIORITY

Historic Water Race Permit	Current Deemed Permit Number	Current Permit Holder	Volume (l/hr)	Legal Description	Point of take
WR359cr Renewal Number 2585B Date: 9 June 1904 Volume: 200,000L/hr WR359CR allocates 600,000l/hr in two parts	94201	Corbridge Park Ltd as partner of Corbridge Est Ltd Partnership	25,000	Sec 65 and Pt Sec 64 Blk IV Lwr Wanaka SD, Sec 1 Blk II Lwr Wanaka SD and Sec 66-67 Blk IV Lwr Wanaka SD	Luggate Creek approx. 2.6km SE of Mt Barker Rd and Boundary Road Intersection (NZMS 260:G40:101-995)
	95541	JA Feint and MC Feint	34,000	Lot 2, 3, 5 DP 20109, Section Part 7, Block II, Cardrona SD	(NZMS 260:G40:101-995)
	95560	Alexander Rowley Morris	68,000	Not specified	Reserve Adjacent to Pt Sec 5, Blk XIII Cardrona SD (NZMS 260:G40:101-995)
	96588	George R Wallis ½ share and JW and JR Cooper ½ share	68,000	Not specified	sec 3 SO 300466, Luggate Creek approx. 3.6km SW of SH6 and Mt Barker Rd (NZMS 260:G40:101-995)
	2001.011.V1	David Stanley Allen	17,000	Not specified	Pt Sec 5 Blk XIII Cardrona SD (NZMS 260:G40:101-995)
Total Vol Under Mining Licences: 2,300,000L/hr			**Total under Deemed Permits:** 2,325,000 l/hr		

Criffel Water Limited
Luggate Creek
Water Volumes & Rate of Take

8 September 2015

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Consulting Engineers
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RD 1
Alexandra 9391
New Zealand

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Criffel Water Limited
Irrigation Volumes & Rate of Take

1. Introduction

Criffel Water Limited has a command area of some 1500 hectares of which close to 1200 ha could be irrigated from Luggate Creek. Existing deemed permits for users total a flow of 601.8 l/s (21.25 heads). The holders of the permits have generally worked well together to manage the water take and distribute the flows fairly. Criffel Water Limited is a new entity to manage the irrigation take and distribution of water to the irrigators that is aimed to provide a level of service that improves the overall management of the shared intake and race system.

These water take consents are required to be renewed prior to 2021. Developments into spray irrigation, water storage and for development of further land within the command area, not currently irrigated, are being considered. It is considered that there is merit in seeking water use for hydro-electricity with the potential for this to be incorporated in pressurized pipeline systems.

This report provides the basis for the requested rate of take and irrigation water volumes.

2. Existing Arrangement

2.1 Intake & Pipeline

The existing intake weir on the Luggate Creek was constructed in 1967. Water is taken via a 685mm internal diameter concrete pipeline to a flow splitter arrangement where the flow measurement occurs.

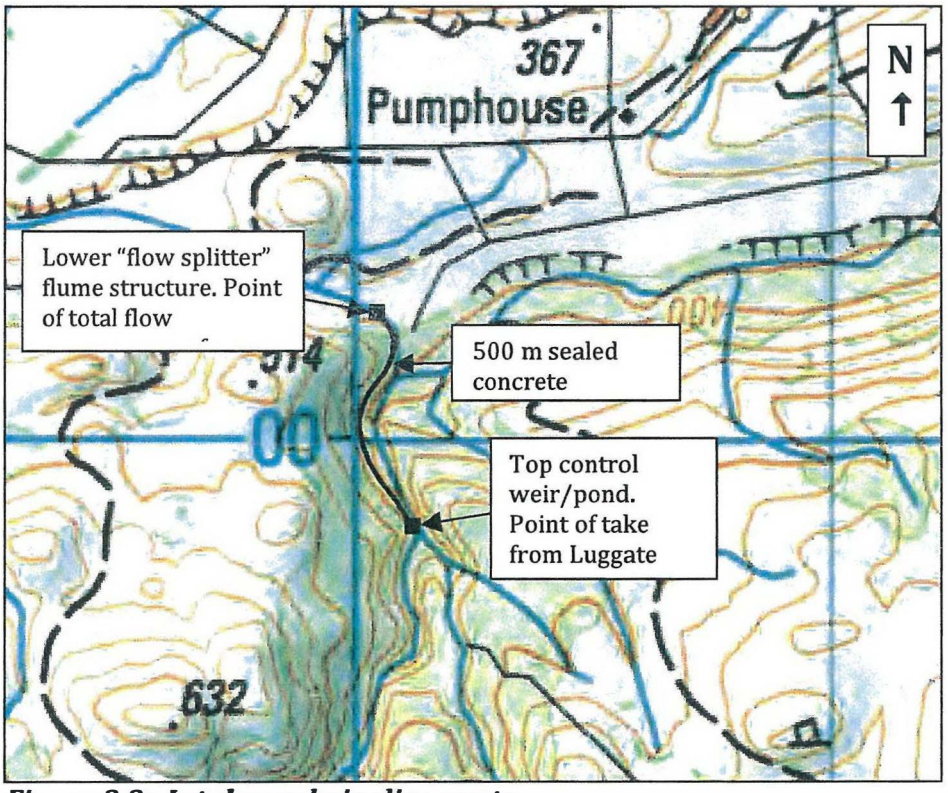

Figure 2.2: Intake and pipeline route

See Figure 2.1 attached for general location and Figure 2.2 for the intake and pipeline route.

2.2 Existing Consents

Details of the existing consents and priorities for the North Branch of Luggate Creek are shown in Table 2.1 attached. The existing users of the existing intake weir and pipeline are to be managed through a new entity Criffel Water Limited. The total of these consents is 601.3 litres/sec (21.25 heads) excluding the Luggate Irrigation Company Limited, whose take point is separate and downstream of the Criffel water point of take.

The weir structure in Luggate Creek was consented as 2007.676 and 2010.056 for a term expiring on 12 April 2045.

3. Hydrology

Environmental Consultancy Services prepared "An Estimation of the Mean Flow of Luggate Creek" for Criffel Station in February 1997.

The Otago Regional Council published a report "Management Flows for Aquatic Ecosystems in Luggate Creek" in August 2006.

Modelling work on the likely available take based on monthly mean flows has been carried out by Tom Heller of Environmental Associates. His spreadsheet is attached as Table 3.1.

A graph of the mean monthly flows and those exceeded 90% of the time are shown in Figure 3.1.

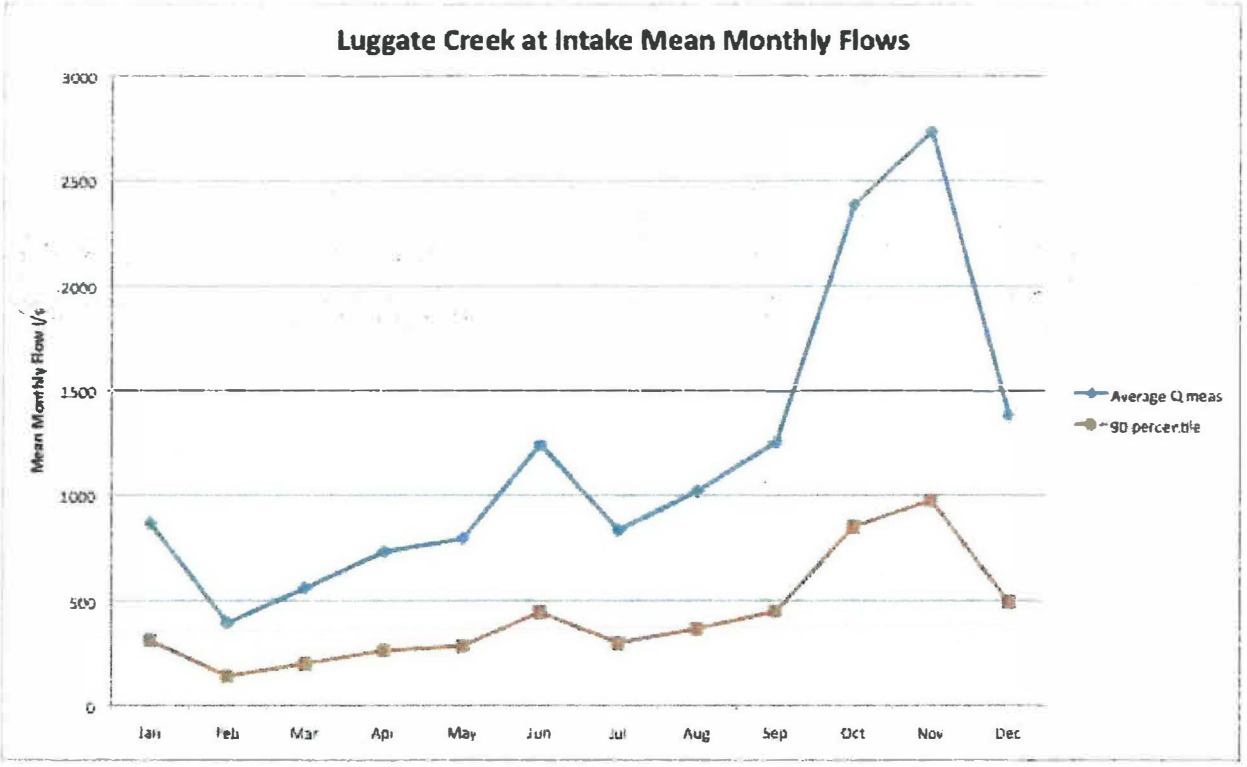

Figure 3.1: Mean Monthly Flows

4. Storage Development

Water storage sites are to be investigated to improve the ability to better utilise the flows available from Luggate Creek and for more efficient spray irrigation application systems. The indicative modeling work carried out by Tom Heller indicated that about 1.37 million m^3 of storage would be required to give 90% reliability. There is no obvious single site for this volume of storage and so a number of distributed storage ponds may be required.

5. Residual / Minimum Flow

When consent No. 2007.676 was granted for the continued use of the diversion weir used by Criffel Water a residual flow of 50 litres per second was applied.

It is considered that no further provision is required as part of this application.

The existing weir is constructed of rock blasted off the sides of the gorge and finer material placed on the upstream side. Considerable leakage through the rock weir is evident. The leakage flow through the weir was estimated to be about 97 l/s on 26 February 2015 (Environmental Consultancy Services). It is considered that the leakage flow is more than sufficient to meet requirements for residual flow at the Criffel weir.

The ORC (under Regional Plan: Water Schedule 2A) has set a minimum flow for the recorder site on Luggate Creek just below the State Highway 6 bridge of 180 litres/sec (1 November-30 April). With the low flows this last summer the Criffel group and the Luggate Irrigation Co have been working together to ensure the minimum flow was not breached.

As this figure has been adopted by the ORC no further in-stream environmental flow studies were deemed necessary.

6. Irrigation Area

6.1 Existing and Proposed Irrigation Areas

A map showing the command area for Criffel Water Limited is attached as Figure 6.1 on LINZ orthophotos from 2002/03. This area totals about 1500 hectares.

Figure 6.2 is the latest World Image obtained via ArcGIS. In this it is difficult to distinguish irrigated from un-irrigated country.

A check has been made of aerial photographs of the area. Google Earth images from April 2005 and December 2011/April 2012 are attached and it is difficult to distinguish irrigated from unirrigated country in the later images. See Figures 6.3A & B.

Queenstown Lakes District website photos are of an unknown date but green and presumably irrigated areas are not dissimilar to the 2002/2003 LINZ photos. Areas of grain crops may not be apparent in these images. See Figure 6.4.

Table 6.1 attached is a list of land areas by legal description with existing and proposed irrigation areas scheduled.

The areas have been provided by the owners and total 966.5 ha of existing irrigation with potential for a further 321 ha, totaling 1287.5 ha.

6.2 Land Use

The irrigation water demand does vary with land use. Viticulture and horticulture use less water than pasture. Crops need water at strategic times but may also use less water on a seasonal basis than pasture.

There is no viticulture within the area at present and there is some 7 hectares of walnuts. While some cropping is carried out the water usage is based on pasture.

The following monthly and seasonal volumes have been based on pasture figures for the Upper Clutha area as shown in the Aqualinc October 2006 report to the ORC.

6.3 Irrigation Efficiency and Water Volumes

In order to obtain new consents it is necessary to both prove that they have been used, or that suitable land can be developed, and that the water use is efficient. The Otago Regional Council commissioned Aqualinc to prepare a report on what efficient use for irrigation is in Otago for different land uses and soil types. See soil map and command area attached (Figure 6.5).

The modeling work by Aqualinc uses the plant available water (PAW) parameter for the soil type. It is assumed that irrigation will take place when half of this soil moisture storage is depleted that ensures that there is not a significant drop off in plant growth due to moisture deficit.

For the Upper Clutha area the recommended monthly limit for pasture varies between 1200 and 1575 m^3/month/hectare (120mm and 157mm). See attached table from Aqualinc 2006 report. The overall seasonal irrigation volumes vary between 5775 and 6750 m^3/hectare (577 to 675mm depths). The variations are due to topsoil depths. These figures were derived from analysis using over 30 years of rainfall records for the areas.

The actual spray irrigation systems in Central Otago are often sized on a peak flow rate of 0.5 l/s/ha that delivers a gross application figure of 4.3mm/day. Some users in the Criffel Water Ltd area consider that they need to use 5 to 6mm/day application rates at times to maintain good pasture growth. On the shallower soils the Aqualinc monthly numbers do provide for just over 5mm per day.

6.4 Irrigation Water Volumes

Map (Figure 6.5) is the irrigation command area superimposed on the GrowOtago soil map. From this map the areas of each soil type were derived. Table 6.2 shows these areas and the associated plant available water (PAW). The Aqualinc (2006)

monthly and seasonal volumes for efficient irrigation are then applied to the proposed irrigation areas to derive a total monthly and seasonal irrigation volume for the Criffel Water Ltd proposed irrigation area.

This is then compared with the monthly and seasonal volumes for the existing consents. The flow of 601.8 l/s provides 1,559,952 m^3/month or about 10% less less than the Aqualinc figures for the 1287.5 hectares of 1,767,188 m^3/month. The seasonal irrigation Aqualinc numbers for the proposed area is 7,772,625 m^3 while the pipeline flowing at full design capacity for the full season could supply 12,478,925 m^3. Stream flow available and minimum flow conditions will mean that such volumes would be constrained. To irrigate that full area would require some water storage.

6.5 Stockwater

An allowance for stockwater distribution should be made, over and above the irrigation water volumes.

If the stockwater was all piped and the 1600 ha command area was stocked with sheep at 15 su/ha the resulting demand at 5 litres/su/day would be 1600 x 15 x 5 = 120,000 litres per day = 1.4 l/s. Cattle would be a slightly higher demand and deer a lower demand.

In practice the current system is open race and flows of 30-50 l/s per race may be required to maintain flows to all properties. Such flows would be required in addition to the irrigation allocation where the races are not operational for irrigation supply at the time. Stockwater flows are required over the winter or irrigation off-season in addition to the irrigation season. The winter season is difficult with frosty conditions requiring flows of up to 200 l/s to ensure the main supply pipeline does not freeze. The water not used by stock eventually bywashes back or returns to the Clutha River. Recent experience this winter has shown that with 120 l/s through the pipeline some properties were not receiving stockwater.

Water volumes of up to 400,000m^3/month over winter are considered practical to maintain stockwater flows. Winter volume over May-August (4 months) is 1,600,000 m^3. During the irrigation season (8 months) at times when all races are not being used for irrigation there may be say 3 races at 40 l/s = 120 l/s or 311,040 m^3/month. If this applied over only 6 months the stockwater flow requirement over the irrigation season is 1,866,240m^3. Total annual volume to maintain stockwater supply is thus 3,466,240m^3, say 3,500,000 m^3.

6.6 Hydro-electricity

Discussions have recently been held relating to the long-term (10 year) plan for the infrastructure for Criffel Water Limited.

There is a total of approximately 1290 ha that is proposed to be irrigated in that time-frame. It is expected that the method of irrigation will be close to completely spray irrigation by that time.

The existing intake water level on Luggate Creek is at 420 m above sea level. Much of the irrigation area is at about 380 m or lower. The Clutha River level opposite the Wanaka Airport is 270m.

If the current open race system is converted to spray irrigation, it makes logical sense for this to utilise the gravity pressure that could be supplied via a fully piped system. This also would improve distribution efficiencies for both stockwater and irrigation supplies.

While irrigation and stockwater would utilise the available gravity pressure while that demand is present, and these purposes would have the highest priority, the prospect of hydro-electric generation in the shoulder and off-seasons has potential.

The rate of take and seasonal and annual volumes has been based on irrigation and stockwater supplies only. If hydro-electric potential is to be considered it also would also require a buffer headwater pond so that generation can occur at the peak demand times of the day. Hydro-electric generation would also be a year round activity that would potentially fully utilise flows up to the pipeline capacity when such flows were available. Hydro-electricity is a non-consumptive use and there would be return flows to the Clutha River.

Storage is also to be investigated to improve the efficiency and reliability of irrigation water supply. The storage investigation and design for both hydro-electricity and irrigation would thus be best considered together.

Indicative numbers for potential hydro-electric at say 400 l/s for 5 months over a 40m drop should generate about 460,000kWh. At $0.10 per kWh this has a value of $46,000 per annum. Capital costs for different pipeline and storage options need to be evaluated as to whether the proposal is likely to have merit.

In a wet year the theoretical maximum annual take volume is the pipeline capacity over 365 days = 18,978,000 m^3. There is insufficient hydrological data to more accurately model what an average year's or a dry year's take would be.

7. Intake Pipeline capacity

The 685mm internal diameter concrete intake pipe original design capacity is 594.7 l/s (21 heads) from the intake weir to the split at the water level recorder site some 490m from the intake. This currently dictates the maximum flow that can be diverted.

Copies of the 1967 newspaper articles state the original design capacity as 21 heads and that has been confirmed by independent calculations by D Attewell. David Hamilton checked the latest topographical survey of the pipeline and confirms that 595 l/s is the theoretical capacity of the 685mm diameter pipeline with a fall of 2.01m in clean condition, but allowing for an increase in interior roughness of the inside surface of the pipe after many years of use. This is considered accurate within a margin of ±5% or ±30 l/s.

A flow of 595 l/s equates to 51,408 m^3/day or 1,542,240 m^3 per 30-day month. Over 8 months this totals 12,317,184 m^3. Over 12 months the volume is 18,978,000 m^3.

Mandy Bell's notes of Sandy and Sylvia Morris' recollections are attached. Sandy clearly states that that pipeline was at times used to the maximum capacity of 21 heads (594.7 l/s) and irrigated 1800 acres (760 ha). The design criteria used by MAF and MWD in 1970 for border-dyke irrigation was for a flow of 0.7 l/s/ha. For 760 ha the irrigation flow required would be 532 l/s. Some of the area was wild flood irrigation with a lower efficiency than border-dyke. This confirms that the full flow could readily have been taken for irrigation and stockwater for the area that Sandy Morris identified.

This flow has not been able to be passed through the pipe in the last couple of years. It is suspected that there had been an accumulation of sands and gravels in some low spots of the undulating pipeline – it is not laid on a steady constant grade over the full length. A topographic survey of the pipeline has been undertaken but an internal inspection of the most likely spots for gravel accumulation has not yet been done. Maintenance work will be carried out so that the full design capacity of the pipeline is restored.

8. Discussion

It is estimated that the mean annual flow at the intake point in Luggate Creek is 1183 l/s (T Heller table). The lowest flow normally occurs in February but is generally low from January through to early winter. The proposed take is 601 l/s.

It appears feasible to provide storage for parts of the command area and some sites will permit gravity or gravity-assisted spray irrigation. This storage investigation is to proceed over the next 1-2 years. Larger seasonal storage that would be required to provide reliability for large areas of irrigation will be investigated as part of this.

The monthly and seasonal volumes have been derived using soil types and terrain information for proposed areas of irrigation with the Aqualinc volumes per hectare, to estimate the required irrigation water volumes. While the area irrigated is currently less than that proposed, the irrigation method is expected to move to spray irrigation with associated greater efficiencies and the available water will be utilised over the greater area. To this must be added the estimated stockwater requirement that is significant in terms of annual volumes for operational reasons.

The Company considers that hydro-electricity should be considered as part of future gravity piped pressurized distribution systems and therefore is applying for a year-round take from the Luggate Creek.

The rates of take and volumes sought reflect the past use of the resource and provide for future development within the existing headworks design capacity. Environmental flows have been provided for by the minimum flows established by the Regional Plan: Water for Luggate Creek.

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Attachments

Table extract from Aqualinc 2006 re ORC irrigation volumes for pasture

Figure 2.1: General location map showing intake on Luggate Creek

Table 2.1: (4 pages) Existing Consents and Priorities

Table 3.1: Tom Heller Modelling Luggate Ck flows and Criffel Water demand

Figure 6.1: Command Area with property boundary over LINZ orthophotos 2000-2003

Figure 6.2: Current World Image of general area (2014)

Figure 6.3A: GoogleEarth Imagery April 2005

Figure 6.3B: GoogleEarth Imagery December 2011/April 2012

Figure 6.4: Current Queenstown Lakes Aerial Imagery of area (undated)

Figure 6.5: Command Area with GrowOtago soil map

Table 6.1: Legal description, landowner and current and proposed irrigation

Table 6.2: Soil type areas by zone and associated monthly and seasonal volumes

Table setting out water takes on North Branch Luggate Creek According to Priority

Notes by Mandy Bell of discussion with Sandy and Sylvia Morris 18 March 2015

Newspaper clippings from 1967 re Criffel Irrigation Committee harnessing of Luggate Creek

Pasture						
Area	PAW crop	Application depth (1) (mm)	Optimum return period (1) (days)	Monthly limit (m^3/ha)	Seasonal limit (m^3/ha)	Year's that determined the seasonal allocation
Strath Taieri	45	22.5	5	1575	6525	1998
	70	35	10	1050	5950	2001/2002
	105	52.5	16	1050	5775	1976/1998/2001/2002
	120	60	19	1200	5400	1976/1982/1985/1998/ 1999/2001/2002/2003
Manuherikia Valley	45	22.5	4	1800	8850	1998
	70	35	7	1750	8050	1998
	105	52.5	12	1575	7875	1998
	120	60	14	1800	7800	1998/2004
Ida Valley	45	22.5	4	1800	7650	1976
	70	35	8	1400	7350	1976
	105	52.5	14	1575	6825	1976
	120	60	16	1200	7200	1976
Upper Taieri	45	22.5	5	1575	6975	1998/2003
	70	35	9	1400	6300	1998/2001/2003
	105	52.5	15	1050	6300	2001/2003
	120	60	18	1200	6000	1998/2001/2003
Mid Clutha	45	22.5	4	1575	7875	2001/2003
	70	35	8	1400	7350	2001/2003
	105	52.5	14	1575	7350	2001/2003
	120	60	16	1200	7200	2001/2003
Upper Clutha	45	22.5	4	1575	6750	2001
	70	35	9	1400	5950	1993/2001
	105	52.5	14	1575	5775	2001
	120	60	17	120	6000	2001
Kawarau	45	22.5	5	1350	5850	2001
	70	35	10	1400	5250	2001
	105	52.5	18	1050	4725	2001
	120	60	22	1200	4800	2001
Coastal Otago	45	22.5	5	1350	6525	1989
	70	35	10	1050	5950	1989
	105	52.5	17	1050	5775	1989
	120	60	21	1200	5400	1989/1995
Lower Clutha	45	22.5	9	900	4275	1976
	70	35	17	700	3850	1976
	105	52.5	31	525	3150	1976
	120	60	40	600	3000	1976
South West Otago	45	22.5	8	900	3375	1978/1990
	70	35	17	700	2800	1976/1986/1990/1995
	105	52.5	38	525	2625	1990
	120	60	52	600	2400	1987

Notes:
(1) Recommendation only. Alternative application depth and return interval combinations may be acceptable.
(2) Based on a 24-hour continuous take.

Parameters: trigger for irrigation=50 %PAW, IR season 1 Sep-30 April, CU=70, Allocation criteria: month or year with greatest irrigation water use. 600 mm rooting depth.

Water Requirements for Irrigation Throughout the Otago Region
Prepared for Otago Regional Council (Report No L05128/2, October 2006)

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Aqualinc (2006) Table. Use Upper Clutha numbers

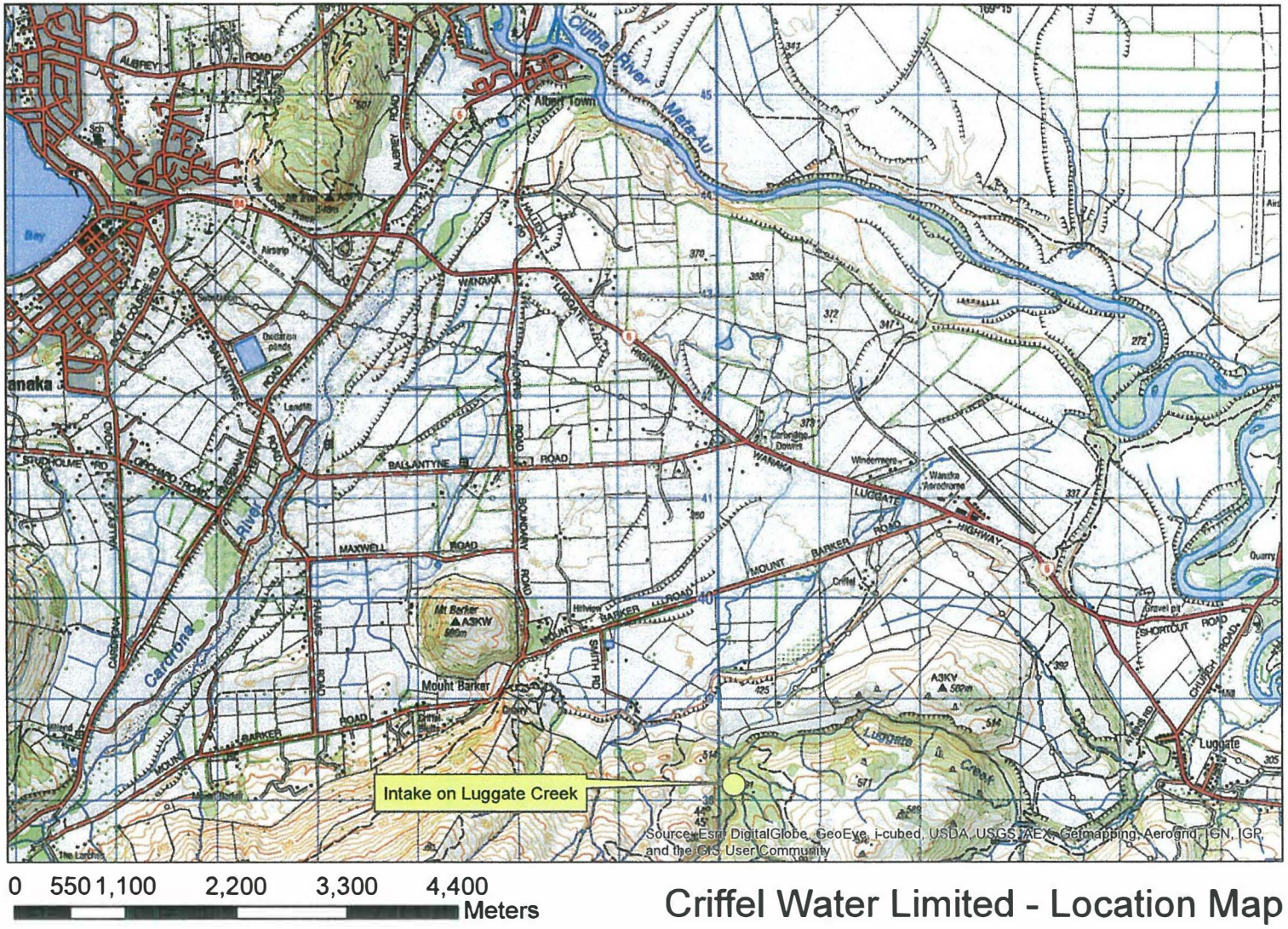

Figure 2.1: General location map

Criffel Water Limited Modelling of Luggate Creek Flows and Demand														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Comment
Average Q meas	868	392	558	732	794	1243	835	1021	1254	2386	2736	1382	14201	
Proportion	0.061122	0.027604	0.039293	0.051546	0.055912	0.087529	0.058799	0.071896	0.088304	0.168016	0.192662489	0.09731709	1	Proportion of total annual flow
90 percentile	310.0131	140.0059	199.2941	261.4396	283.5834	443.9473	298.2269	364.6583	447.8761	852.1789	977.184142	493.5922822	5072	Proportional to average Q for 90-percentile flow
90 percentile q	310.0131	140.0059	199.2941	261.4396	283.5834	443.9473	298.2269	364.6583	447.8761	852.1789	977.184142	493.5922822		
Jan peak use historical (533)	533	592.2222	444.1667	236.8889	29.61111	0	0	0	59.22222	236.8889	296.1111111	533	2961.11	Proportional use based on peak in Jan of xx% total consented take
Jan peak use now (844)	844	937.7778	703.3333	375.1111	46.88889	0	0	0	93.77778	375.1111	468.8888889	844	4688.89	Proportional use based on peak in Jan of xx% total consented take
Seasonal use proportion	0.18	0.2	0.15	0.08	0.01	0	0	0	0.02	0.08	0.1	0.18	1.00	
Natural flow at Luggate town	843.0131	732.2281	643.4608								1273.295253	1026.592282		
Natural flow u/s Criffel take	522.6681	453.9814	398.9457								789.4430569	636.487215		
Natural flow in Alice Burn	320.345	278.2467	244.5151								483.8521962	390.1050672		
Diff from min flow	-130.01	39.99	-19.29	-81.44	-103.58	-263.95	-118.23	-184.66	-267.88	-672.18	-797.18	-313.59		
Diff in use	311	345.5556	259.1667	138.2222	17.27778	0	0	0	34.55556	138.2222	172.7777778	311		
O/A diff in stream flow	180.99	385.55	239.87	56.78	-86.31	-263.95	-118.23	-184.66	-233.32	-533.96	-624.41	-2.59		
% cut of nom use now	0.214439	0.411131	0.341051	0.151375	-1.84064				-2.48801	-1.42346	-1.33167234	-0.00307142		
criffel scheme nominal use (528)	528	586.6667	440	234.6667	29.33333				58.66667	234.6667	293.3333333	528	2933.33	
reduction	113.224	241.1969	150.0624	35.52277	-53.5921				-145.964	-334.039	-390.623887	-1.62171211		
Restricted take	414.776	345.4697	289.9376							568.7059	683.9572199	529.6217121		
storage required	293,477	625,182	388,962	92,075	-139,948	0	0	0	-378,337	-865,830	-1,012,497	-4,203		
actual storage required	293476.7	625182.4	388961.8	92075.01	0	0	0	0	0	0	0	0	1,399,696	
Total consented allocation =	987 L/s													

Table 3.1: Tom Heller Modelling Luggate Creek Flows and Demand identifying Water Storage Requirements

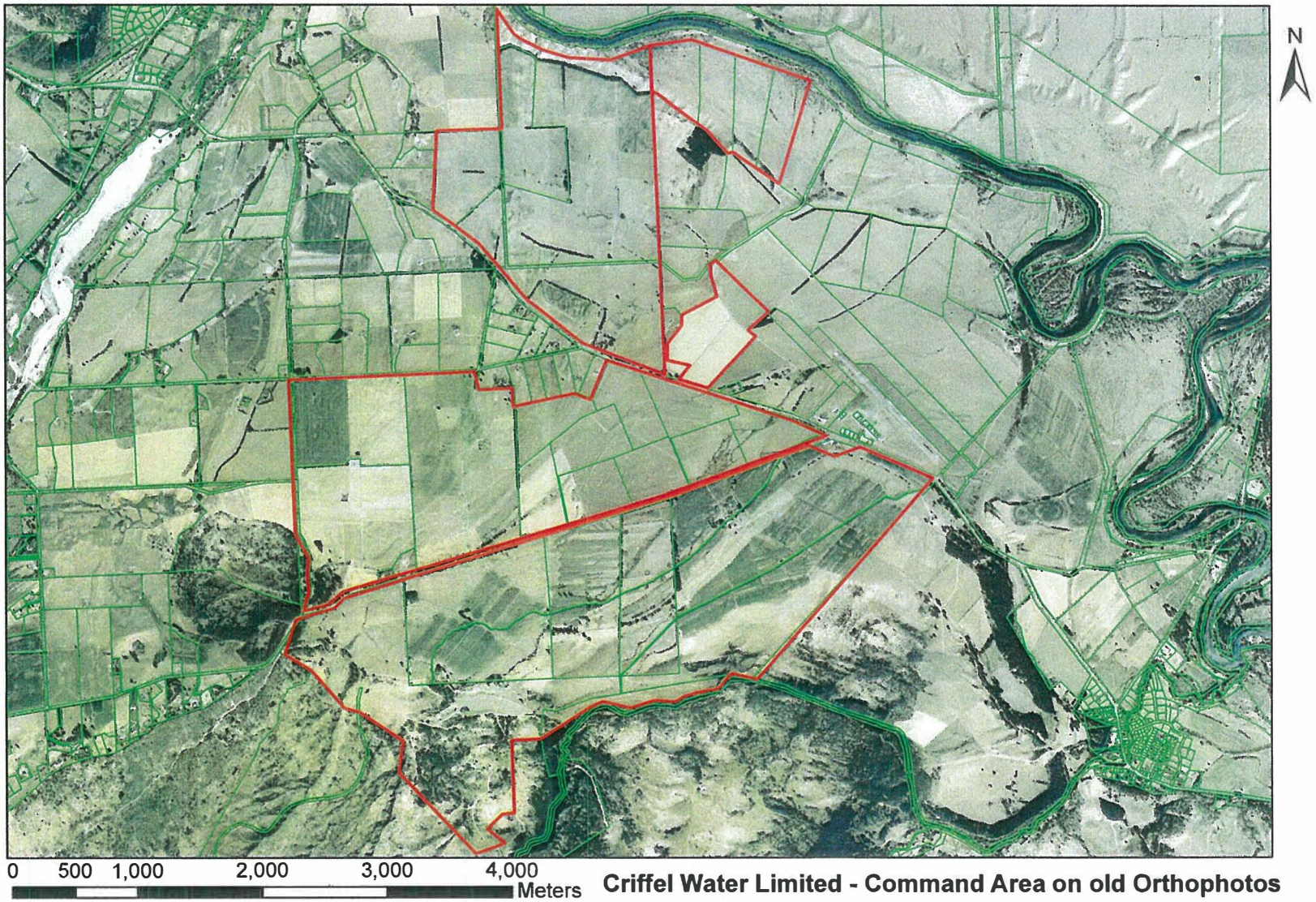

Figure 6.1: Criffel Water Limited Command Area on LINZ Orthophotos 2002/03

David Hamilton & Associates Ltd November 2014 ArcGIS World Imagery Base Current at 28 Nov 2014

Figure 6.2: Current World Image from ArcGIS of general area

Figure 6.3A: GoogleEarth Imagery of area 6 April 2005

Figure 6.3B: GoogleEarth Imagery of area (Western area 3 April 2012, Eastern area 3 Dec 2011)

Figure 6.4: Queenstown Lakes District Council Website Latest Imagery of area (undated)

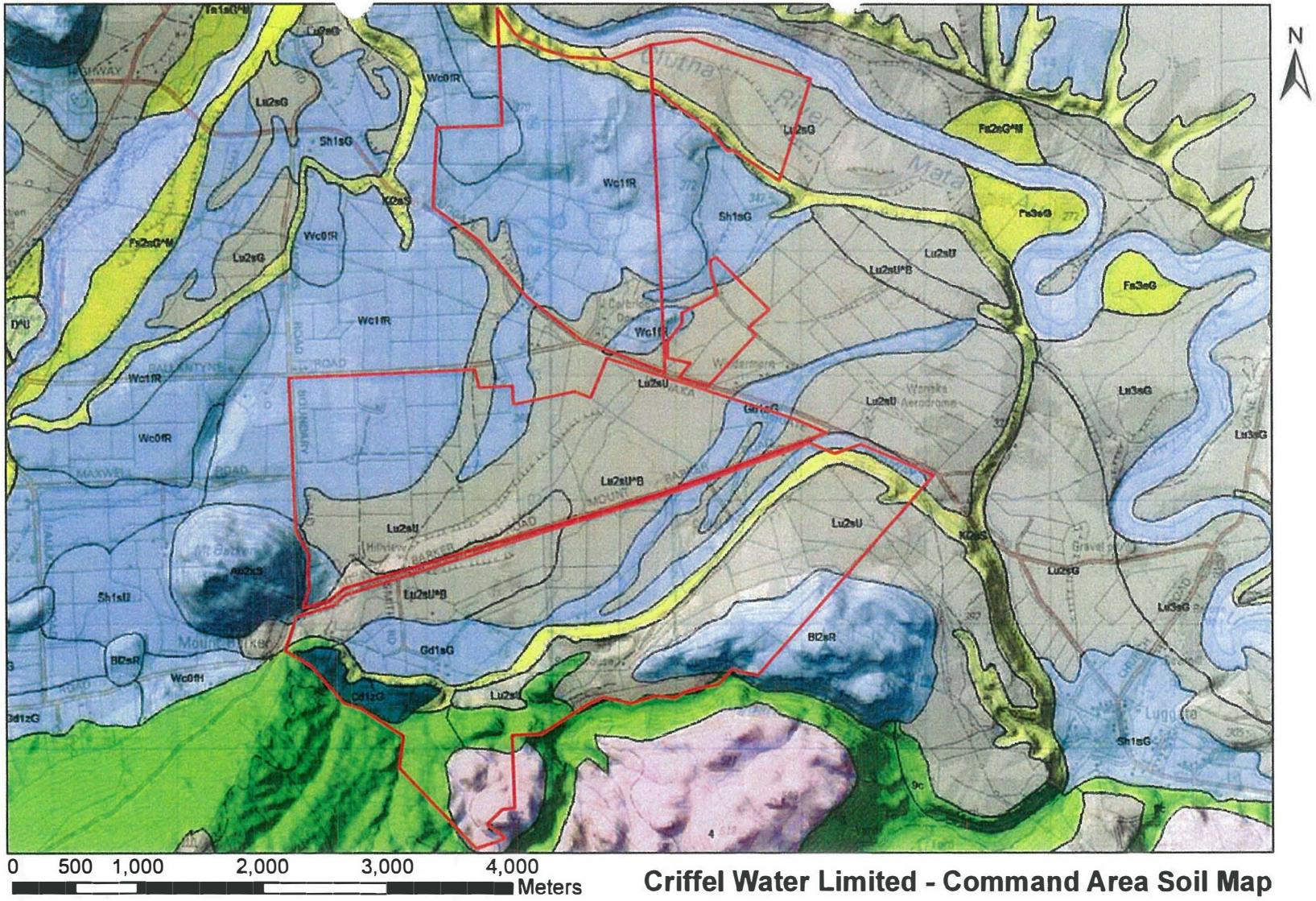

Figure 6.5: Command Area and GrowOtago soil map

Criffel Water Limited										
Command Area by Property						DH	Irrigation Areas - hectares			
North	Owner	Legal Description	Gross Area ha	Property Totals ha	Legal Area ha	Red boundary	Existing	Potential	Total	Sub-totals
	Corbridge Estates Limited Partnership	Pt S.64 Blk IV	33.2968							
	Corbridge Estates Limited Partnership	S.65 Blk IV Lower Wanaka SD	43.4690							
	Corbridge Estates Limited Partnership	S.67	160.0000							
	Corbridge Estates Limited Partnership	S.66	13.2530							
	Corbridge Estates Limited Partnership	S.1 Blk II Lower Wanaka SD	72.0062	322.0250			280		280	
	The Big River Company Limited	Lot 6 DP340031	41.3619				35			
	The Big River Company Limited	Lot 1 DP325795	20 0854					16		
	The Big River Company Limited	Lot 2 DP325795	20.1490	81.5963				16	67	
	Southvine Holdings Limited	Lot 3 DP325795	20.4061					18		
	Southvine Holdings Limited	Lot 4 DP325795	21.0366	41.4427				18	36	
					445	448				383
Middle	Cooper JW & JR	Lot 3 DP303795	63.111	63.111			63		63	
	Allen DS	Lot 2 DP21379	121.3895	121.3895			117		117	
	Wallis GR, Wallis J, Grant SJ	Lot 1 DP303795	83.531	83.531			84		84	
	Glaister ME	Lot 1 DP7916	0.8376	0.8376						
	Wilkinson GR, McKnight RS, Anderson Lloyd	Lot 1 DP 24944	2.8326	2.8326						
	Tucker ST, Grimshaw NK	Lot 6 DP305038	20.669	20.669				20	20	
	Kung K, Belmont Trust Limited	Lot 4 DP305038	20.024							
	Kung K, Belmont Trust Limited	Lot 5 DP305038	20.189							
	Kung K, Belmont Trust Limited	Lot 7 DP305038	21.889	62.102				60	60	
	Wood JD Wood KP, Clarke BR	Lot 8 DP305038	22.251	22.251						
	Rising Star Limited	Lot 9 DP305038	20.421	20.421				20	20	
	Staufenberg U, Staufenberg AB	Lot 3 DP305038	20.059	20.059						
	Mt Barker Properties Limited	Lot 2 DP305038	20.014	20.014				20	20	
	Young WR, Young JM, Brown SJB	Lot 1 DP305038	19.251							
	Young WR, Young JM, Brown SJB	Lot 10 DP305038	0.5757	19.8267				20	20	
					457	459				404
South	Jeremy Bell Investments Limited	S.8 Blk II Lower Wanaka SD	114.9299							
	Jeremy Bell Investment sLimited	Lot 3 DP300397	135.8319							
	Jeremy Bell Investment sLimited	Lot 2 DP300397	94.2187							
	Jeremy Bell Investments Limited	S.32 Blk VI Tarras SD	10.9265							
	Jeremy Bell Investments Limited	Part Lot 1 DP 300397	198.5	554.407			259.5	113	372.5	
	Morris AR	Lot 1 DP20109	38.14							
	Morris AR	Lot 4 DP20109	31.49	69.63			69		69	
	Feint JA, Feint MC	Lot 2 DP20109	25.71							
	Feint JA, Feint MC	Lot 3 DP20109	23.53							
	Feint JA, Feint MC	Lot 5 DP20109	10.0265	59.2665			59		59	
	Lake McKay Station Limited	Part S.8 SO300466	15	15						
					698	701				500.5
				1600.412		1608	966.5	321	1287.5	1287.5

Table 6.1: Legal Descriptions, Landowners and Current and Proposed Irrigation Areas

Criffel Water Limited Proposed Irrigated Area Soils and associated water volumes										
Areas of Soils hectares		**GrowOtago soil boundaries**			**Proposed Irrigated Areas**					
Zone	**Gd1sG**	**Hill 10**	**Cd1zG**	**Hill 4**	**Bl2sR**	**Ki2sS**	**Wc0fR & Wc1fR**	**Sh1sG**	**Lu2sU & Lu2sG**	**Total Area to be Irrigated**
North						12.5	277	1	92.5	383
Middle	20						138		246	404
South	110	55		30		45			260.5	500.5
Totals	130	55	0	30	0	57.5	415	1	599	**1287.5**
Name	Gladbrook	Arrow	Cluden	Conroy	Blackstone	Koinga	Wanaka	Shotover	Luggate	
Depth	mod deep		mod dep		shallow	shallow	deep & mod deep	mod deep	mod deep	
Type	sandy loam		silt loam		sandy loam	sandy loam	fine sandy loam	sandy loam	sandy loam	
Secondary Name	Barrhill					Tucker			Gibbston	
Plant Available Water 600mm										
PAW mm	98.6		80.3		56.7	31	146.2		58.9	
Depth limited					50					
Use PAW	105	45	70	45	45	45	120	70	70	
Application Depth mm	52.5	22.5	35	22.5	22.5	22.5	60	35	35	
Optimum Return Period days	14	4	9	4	4	4	17	9	9	
Monthly Limit m3/ha	1575	1575	1400	1575	1575	1575	1200	1400	1400	
Seasonal Limit m3/ha	5775	6750	5950	6750	6750	6750	6000	5950	5950	
Water Volumes										
Monthly m3	204,750	86,625	-	47,250	-	90,563	498,000	1,400	838,600	1,767,188
Seasonal (Sept-April) m3	750,750	371,250	-	202,500	-	388,125	2,490,000	5,950	3,564,050	7,772,625
Flow of 21.25 heads = 601.8 l/s	1,559,866	m3/month	OR	12,478,925	m3/season					

Table 6.2: Soil type areas by zone and associated water volume

TABLE SETTING OUT WATER TAKES ON NORTH BRANCH LUGGATE CREEK ACCORDING TO PRIORITY

Historic Water Race Permit	Current Deemed Permit Number	Current Permit Holder	Volume (l/hr)	Legal Description	Point of take
WR359cr Renewal Number 2585B Date: 9 Sept 1887 Volume: 400,000L/hr WR359CR allocates 600,000l/hr in two parts	94201	Corbridge Park Ltd as partner of Corbridge Est Ltd Partnership	50,000	Sec 65 and Pt Sec 64 Blk IV Lwr Wanaka SD, Sec 1 Blk II Lwr Wanaka SD and Sec 66-67 Blk IV Lwr Wanaka SD	Luggate Creek approx. 2.6km SE of Mt Barker Rd and Boundary Road Intersection (NZMS 260:G40:101-995
	95541	JA Feint and MC Feint	66,000	Lot 2, 3, 5 DP 20109, Section Part 7, Block II, Cardrona SD	(NZMS 260:G40:101-995
	95560	Alexander Rowley Morris	132,000	Not specified	Reserve Adjacent to Pt Sec 5, Blk XIII Cardrona SD (NZMS 260:G40:101-995
	96588	George R Wallis ½ share and JW and JR Cooper ½ share	132,000	Not specified	sec 3 SO 300466, Luggate Creek approx. 3.6km SW of SH6 and Mt Barker Rd (NZMS 260:G40:101-995
	2001.011.V1	David Stanley Allen	33,000	Not specified	Pt Sec 5 Blk XIII Cardrona SD (NZMS 260:G40:101-995

TABLE SETTING OUT WATER TAKES ON NORTH BRANCH LUGGATE CREEK ACCORDING TO PRIORITY

Historic Water Race Permit	Current Deemed Permit Number	Current Permit Holder	Volume (l/hr)	Legal Description	Point of take
WR7284CR Privilege Number 1496 Date: 9 Dec 1897 Volume 200,000	N/A	Luggate Irrigation Company Limited	200,000	Not specified	At point in Nth Branch of Luggate Creek at Intake of WR1496
WR2579/98 Renewal Number 3296A Date: 18 Dec 1898 Volume: 800,000L/hr	97629_v1	Jeremy Bell Investments Limited	800,000	Not specified	River Reserve btwn Run 625 + Sec5, Blk XIII, Cardrona SD Luggate Creek 5.5km upstream of Luggate Domain (NZMS 260:G40:101-998)
WR412Cr Date: 11 May 1900 Volume: 700,000L/hr (original licence provided for 10 sluice heads) [t]	N/A	Jeremy Arthur Bell	700,000	Not specified	Commencing at point in Nth Branch of Luggate Creek about a mile above the junction of the north and south branches

TABLE SETTING OUT WATER TAKES ON NORTH BRANCH LUGGATE CREEK ACCORDING TO PRIORITY

Historic Water Race Permit	Current Deemed Permit Number	Current Permit Holder	Volume (l/hr)	Legal Description	Point of take
WR359cr Renewal Number 2585B Date: 9 June 1904 Volume: 200,000L/hr WR359CR allocates 600,000l/hr in two parts	94201	Corbridge Park Ltd as partner of Corbridge Est Ltd Partnership	25,000	Sec 65 and Pt Sec 64 Blk IV Lwr Wanaka SD, Sec 1 Blk II Lwr Wanaka SD and Sec 66-67 Blk IV Lwr Wanaka SD	Luggate Creek approx. 2.6km SE of Mt Barker Rd and Boundary Road Intersection (NZMS 260:G40:101-995)
	95541	JA Feint and MC Feint	34,000	Lot 2, 3, 5 DP 20109, Section Part 7, Block II, Cardrona SD	(NZMS 260:G40:101-995)
	95560	Alexander Rowley Morris	68,000	Not specified	Reserve Adjacent to Pt Sec 5, Blk XIII Cardrona SD (NZMS 260:G40:101-995)
	96588	George R Wallis ½ share and JW and JR Cooper ½ share	68,000	Not specified	sec 3 SO 300466, Luggate Creek approx. 3.6km SW of SH6 and Mt Barker Rd (NZMS 260:G40:101-995)
	2001.011.V1	David Stanley Allen	17,000	Not specified	Pt Sec 5 Blk XIII Cardrona SD (NZMS 260:G40:101-995)
Total Vol Under Mining Licences: 2,300,000L/hr			**Total under Deemed Permits:** 2,325,000 l/hr		